

# **INFORMATION-SEEKING PROCESSES AMONG PRIMARY SCHOOL CHILDREN IN AUSTRALIA AND MALAYSIA**

A thesis submitted in fulfilment of the requirements for the degree of  
Doctor of Philosophy

**Shamila Mohamed Shuhidan**

BHSc. in Accounting (Hons)

Master of Science in Information Management

School of Business Information Technology & Logistics

College of Business

RMIT University

**August 2013**

## Declaration

I certify that except where due acknowledgement has been made, the work is that of the author alone; the work has not been submitted previously, in whole or in part, to qualify for any other academic award; the content of the thesis is the result of work which has been carried out since the official commencement date of the approved research program; any editorial work, paid or unpaid, carried out by a third party is acknowledged; and, ethics procedures and guidelines have been followed.

A handwritten signature in black ink, appearing to read 'Shamila', with a horizontal line underneath.

SHAMILA MOHAMED SHUHIDAN

22 August 2013

## Acknowledgements

Alhamdulillah (Praise be to God), to whom I pray and seek guidance, for giving me the strength to complete this memorable expedition.

This thesis is dedicated to all my beloved: especially to my late father, Hj. Mohamed Shuhidan Ariffin. His words of inspiration and encouragement in finishing this thesis were never ending till now and still linger on. I thank my mother, Hjh. Maimun, my parents in-law, Hj. Abd Hakim and Hjh. Khadijah, siblings and family-in-law for all their support, attention, sacrifices, prayer and unconditional love. My heartfelt thanks to my beloved husband, Azma Asnawishah and my children, Aiman, Amree and Alisha for always being there with me to encourage and care, and for understanding and giving me the strength to endure this journey. My gratitude is also expressed to all my friends for their continuous help and support along my PhD journey.

My greatest gratitude to Associate Professor Peter Macauley and Dr Sue Reynolds, my two wonderful supervisors for their continuous encouragement, guidance and support of my research. Thank you for your informative suggestions and brilliant ideas, for being understanding mentors, giving me the flexibility to work at my own pace, sharing the tears and helping me to make it through the ups and downs. Your vast experience in this field offered me very valuable and constructive advice to make this thesis come to fruition.

Thanks to my main sponsor, the Ministry of Higher Education, Malaysia and my employer, Universiti Teknologi MARA (UiTM) for supporting me all the way in finishing this thesis. I would also want to thank my faculty members and the Dean of Faculty of Information Management, UiTM Shah Alam, RMIT School of Business Information Technology & Logistics staff members, and RMIT School Graduate Research Office (SGR) for their words of wisdom and encouragement. I acknowledge the assistance of a proof-reader and statistician, and thank them also

for encouraging me to write and helping me with my English writing. I also thankful to all the participants and respondents of this research, and many thanks to schools involved, without their contributions, this thesis will not be completed and success.

## **Abstract**

Interest in information behaviour and information seeking has encompassed the school context. As the Internet has become one of the most important sources of information in supporting primary children's learning environments, information behaviour and information-seeking by children has become a key issue which requires more in-depth research. Research in the present study was carried out in Australia and Malaysia. This research shows how children seek information within a school context, particularly the processes taken for information-seeking. The research also identifies the challenges faced by school children in seeking information from the Internet. The research adapted Kuhlthau's (1993) model of the six stages of the information search process – initiation, selection, exploration, formulation, collection and presentation – in order to address the research objectives.

The research involved three phases of data collection. The first phase involved a broad survey (quantitative data) in order to allow generalisation of results from a primary school population to identify the usage, knowledge and challenges of using the Internet in the school setting. The next phase was observation. As the research focused on the information-seeking processes undertaken by primary school children, observation was the best way to carry out the investigation. It involved observation of children seeking information from the Internet as they performed information-seeking tasks in 20-minute sessions. Three sets of tasks were set. The observations were aided by the use of a checklist and note taking. The checklist was based on the Kuhlthau (1993) model of information search process (ISP), and the note taking served as a memory aid that contained extensive detail from the observations. The final phase of the research involved interviews (qualitative data) with the teachers, directed at determining the primary school children's information behaviour and how they undertook information-seeking in the school settings.

The research provides an understanding of information-seeking processes among primary school children and makes recommendations for librarians and information technology specialists on the design elements of information retrieval systems and online materials for primary school children based on the behavioural and information-seeking approaches used by the children and their teachers. A modified model of information-seeking processes is proposed. These modifications incorporate the use of the Internet in seeking information in the school environment.

## List of abbreviations

ABS	Australia Bureau of Statistics
CIA	Central Intelligence Agency
DEECD	Department of Education and Early Childhood Development
FUSE	Find, Use and Share Education
ICT	Information and communications technologies
ISP	Information search process
KSSR	Kurikulum Standard Sekolah Rendah
MAMPU	Malaysian Administrative Modernizations and Management Planning Unit
MCMC	Malaysian Communication and Multimedia Commission
NAPLAN	The National Assessment Program for Literacy and Numeracy
PMR	Penilaian Menengah Rendah
RMIT	Royal Melbourne Institute of Technology or RMIT University
SCONUL	Society of College, National and University Libraries
SPM	Sijil Pelajaran Malaysia
SPSS	Statistical Package for Social Sciences
STPM	Sijil Tinggi Pelajaran Malaysia
UPSR	Ujian Penilaian Sekolah Rendah
VELS	Victorian Essential Learning Standards
YDPA	Yang Di Pertuan Agong

## Table of contents

1	Overview and Context of the Research .....	1
1.1	Introduction	1
1.2	Rationale for the Research	1
1.3	Problem Statement	3
1.4	Research Questions	4
1.5	Research Objectives	4
1.6	Research Methodology and Approach	5
1.6.1	Conceptual Framework	6
1.7	Key findings	7
1.8	Contribution of Research	7
1.9	Key Concepts	8
1.10	Organisation of the Thesis	10
1.11	Summary	13
2	Setting the Cultural Context and Background of Australia and Malaysia.....	14
2.1	Introduction	14
2.2	Australia	14
2.2.1	Political and Economic Systems in Australia	17
2.3	Malaysia	17
2.3.1	Political and Economic Systems in Malaysia	19
2.4	The Education System in Australia	21
2.4.1	Overview of Primary Education in Victoria, Australia	23
2.5	The Education System in Malaysia	24
2.5.1	Overview of Primary Education in Malaysia	27
2.6	Internet Usage in Australia and Malaysia	29
2.6.1	Internet Usage in Schools	33



2.7	Culture and Education	36
2.7.1	Definition and Elements	36
2.7.2	Elements in Culture	36
2.7.3	How Cultural Dimensions Affect Online Education	38
2.7.4	Culture in Malaysia and Australia	40
2.8	Summary	42
3	Literature Review .....	43
3.1	Introduction	43
3.2	Information-Seeking – Definition and Concepts	44
3.3	Information-Seeking Processes and Children	46
3.3.1	Children’s Intellectual Development and Information Processing Theory	47
3.4	Models in Information-Seeking	52
3.4.1	Wilson’s Model	52
3.4.2	The Ellis Model	53
3.4.3	Kuhlthau’s Model	54
3.4.4	Marchionini’s Model	55
3.4.5	Johnson’s Comprehensive Model of Information Seeking	56
3.5	Conceptual Framework	61
3.5.1	Conceptual Framework Development	63
3.6	Internet Use by Primary School Children	67
3.7	Children’s Knowledge, Literacy and Research Skills in Using the Internet	70
3.8	Tasks and Learning Processes	72
3.9	Teachers’ and Teacher Librarian Guidance	74
3.10	Information-Seeking and Culture	77
3.11	Summary	78
4	Research Methods and Approach .....	79
4.1	Introduction	79

4.2	Mixed Methods Approach	80
4.3	Research Paradigm	84
4.4	Case Study Research	86
4.5	Data Collection Techniques	90
4.5.1	Questionnaires	90
4.5.2	Observations	92
4.5.3	Interviews	95
4.6	Ethics Clearance	96
4.7	Procedure for Data Collection	97
4.7.1	Questionnaires and Observation Procedures	97
4.7.2	Interview Procedures	98
4.8	Development of Themes	98
4.8.1	Initiation Stage	99
4.8.2	Selection Stage	99
4.8.3	Exploration Stage	100
4.8.4	Formulation Stage	100
4.8.5	Collection Stage	100
4.8.6	Presentation Stage	101
4.9	Sample Selection	101
4.10	Research Design	104
4.10.1	Phase 1: Initial and Pilot Study	105
4.10.2	Phase 2: Data Collection	106
4.10.3	Phase 3: Data Analysis	107
4.11	Validity and Reliability	109
4.12	Summary	110
5	Primary School Children's Information-Seeking Process: Students' Perspectives .....	111
5.1	Introduction	111
5.2	Section A - School Children's Background	112

5.2.1	Having Computer and Internet Access at Home (Computer vs Internet)	114
5.3	Section B - School Children's Knowledge, Usage and Challenges of the Internet	115
5.3.1	Purpose of Using the Internet in the School Environment	117
5.3.2	Type of Information	121
5.3.3	Type of Resources	124
5.3.4	Assistance in Finding Information on the Internet	125
5.3.5	Challenges in Finding Information on the Internet	126
5.3.6	Favourite Search Engine	129
5.4	Section C - Information-Seeking Process	130
5.5	Reliability Analysis	132
5.6	Non-Parametric Analysis	132
5.7	Summary	136
6	Observation of Primary School Children's Information-Seeking .....	138
6.1	Introduction	138
6.2	Case Profile - Australia	139
6.3	Case Australia	143
6.3.1	AUS1	145
6.3.2	AUS2	147
6.3.3	AUS18	150
6.3.4	AUS15	151
6.3.5	AUS12	153
6.3.6	AUS23	155
6.3.7	AUS7	157
6.3.8	AUS3	159
6.3.9	AUS4	161

6.3.10	AUS21	164
6.3	Case Australia (Observation) Summary	168
6.5	Case Profile : Malaysia	169
6.6	Case Malaysia	171
6.6.1	MSIA1	172
6.6.2	MSIA2	175
6.6.3	MSIA3	177
6.6.4	MSIA4	180
6.6.5	MSIA5 & MSIA6	183
6.6.6	MSIA7	185
6.6.7	MSIA18 and MSIA29	186
6.6.8	MSIA8 & MSIA9	186
6.6.9	MSIA10	188
6.7	Case Malaysia (Observation) Summary	191
6.8	Summary	192
7	Teachers' Perspectives of Primary School Childrens' Information Seeking .	194
7.1	Introduction	194
7.2	Information-Seeking Process of Primary School Children in Australia	195
7.2.1	Initiation Stage	195
7.2.2	Selection Stage	197
7.2.3	Exploration Stage	198
7.2.4	Formulation Stage	200
7.2.5	Collection Stage	201
7.2.6	Presentation Stage	201
7.3	Case Australia (Intereview) Summary	202
7.4	Information-Seeking Process for Primary School Children in Malaysia	208
7.4.1	Initiation Stage	208
7.4.2	Selection Stage	213

7.4.3	Exploration Stage	217
7.4.4	Formulation Stage	219
7.4.5	Collection Stage	219
7.4.6	Presentation Stage	220
7.5	Case Malaysia (Interview) Summary	221
7.6	Summary	226
8	Discussion.....	229
8.1	Introduction	229
8.2	Research Context of Findings and Discussion	229
8.2.1	Research Questions	232
8.2.2	Research Objectives	232
8.3	Cross-Case Analysis: Observation and Interview Findings	232
8.3.1	Cross-Case Analysis: Interpretations from Observation of Students' Information-Seeking Processes	233
8.3.2	Summary of Cross-Case Observation Analysis	250
8.3.3	Cross-Case Analysis of Teacher Interviews	251
8.3.4	Summary of Cross-Case Analysis of Teacher Interviews	261
8.4	Cross-Case Thematic Analysis (Australia and Malaysia Cases)	262
8.4.1	Similarities in Findings	264
8.4.2	Differences in Findings	266
8.4.3	Emerging Findings	269
8.5	“What are the processes undertaken by school children when searching for information for academic purposes from the Internet?”	270
8.6	“What are the successful factors and challenges that primary school children face when searching information from the Internet for academic purposes?”	272
8.6.1	Information Behaviour	272
8.6.2	Information Need	276

8.6.3	Information Environment	278
8.6.4	Information Use	279
8.6.5	Challenges in Finding Information from the Internet	281
8.7	Summary	282
9	Conclusion .....	286
9.1	Introduction	286
9.1.1	ISP Framework Element: Input – Users (Children/Students)	287
9.1.2	ISP Framework Element: Input – Information Environment (Internet Usage)	288
9.1.3	ISP Framework Element: Input – (Task/Assignment)	289
9.1.4	ISP Framework Element: Process - Information-Seeking Processes Based on Kuhlthau’s Model	291
9.1.5	ISP framework Element: Output – Information Found by the Students/Submission of Completed Assignment	292
9.2	Barriers in the Information-Seeking Process among Primary School Children	294
9.2.1	Culture	294
9.2.2	Language	295
9.2.3	Content Credibility	295
9.2.4	Network Accessibility /Digital Divide	297
9.2.5	Social Effects	297
9.2.6	Government Policy	298
9.3	Contribution to Theory	300
9.4	Contribution to Practice	300
9.5	Limitations of the Study	303
9.6	Future Research Directions	304
9.7	Summary	305
	References .....	306

Appendix A: Survey Questionnaires .....	330
Appendix B: Observation Checklists .....	333
Appendix C: Teacher Interview Questions (Semi-Structured) .....	336
Appendix D: Plain Language Statement .....	340
Appendix E: Consent Form .....	341

## List of figures

Figure 1.1: Thesis structure .....	10
Figure 2.1: Map of Australia .....	15
Figure 2.2: Map of Malaysia .....	18
Figure 2.3: Number of schools by states and territories in 2011 .....	21
Figure 2.4: Type of Internet activities undertaken at home by child Internet users (2009) .....	30
Figure 2.5: Internet users in selected countries (per 100 inhabitants).....	31
Figure 2.6: Malaysian Internet users by usage .....	32
Figure 2.7: Malaysian Internet users by age group (2006/2008) .....	33
Figure 2.8: Online educational resources (FUSE).....	34
Figure 2.9: Education Web TV .....	35
Figure 2.10: Education portal .....	35
Figure 3.1: Bloom's taxonomy by Bloom & Krathwohl, (1956).....	48
Figure 3.2: New version of Bloom's Taxonomy by Anderson & Krathwohl (2001) .....	49
Figure 3.3: Problem-solving model of the information-seeking and searching process by Wilson (1999).....	52
Figure 3.4: Kuhlthau's information-searching process model (1993) .....	55
Figure 3.5: The information-seeking process by Marchionini (1989) .....	56
Figure 3.6: Johnson's Comprehensive Model of Information Seeking (1995, 2003) .....	57
Figure 3.7: Model and theory underpinning the research .....	60
Figure 3.8: Information-search process based on Kuhlthau's model (1993).....	64
Figure 3.9: Conceptual Framework .....	64
Figure 4.1: Typology of mixed research and mixed methods .....	82



Figure 4.2: Data collection techniques based on case studies in Australia and Malaysia .....	89
Figure 4.3: Research design .....	104
Figure 5.1: Frequency of having computer at home .....	114
Figure 5.2: Frequency of having Internet access at home .....	114
Figure 5.3: Frequency of purpose of using the Internet in the school environment .....	117
Figure 5.4: Comparison of purpose of using Internet services between Malaysian and Australian primary school children .....	118
Figure 5.5: Type of subject information.....	121
Figure 5.6: Type of subject information between primary school children in Malaysia and Australia .....	122
Figure 5.7: Type of resources to find information .....	125
Figure 5.8: Type of resources between primary school children from Malaysia and Australia .....	125
Figure 5.9: Challenges in finding information on the Internet.....	127
Figure 5.10: Challenges in finding information from Internet between primary school children from Malaysia and Australia.....	127
Figure 5.11: Frequency of variable in the information-seeking process.....	131
Figure 6.1: Site used for answering first question (AUS1) .....	146
Figure 6.2: Site used for answering second question (AUS1) .....	146
Figure 6.3: Completed task by AUS1 saved in Word document .....	147
Figure 6.4: Site for answering first and second questions (AUS2).....	149
Figure 6.5: Completed task by AUS2 saved in Word document .....	149
Figure 6.6: Site for answering questions (AUS18) .....	150
Figure 6.7: Site for answering questions (AUS18) .....	151
Figure 6.8: Completed task by AUS18 saved in Word document .....	151
Figure 6.9: Site for answering questions (AUS15) .....	152
Figure 6.10: Completed task by AUS15 saved in Word document .....	153

Figure 6.11: Site for answering questions (AUS15) .....	154
Figure 6.12: Completed task by AUS12 saved in Word document .....	155
Figure 6.13: Site for answering questions (AUS23) .....	156
Figure 6.14: Completed task by AUS23 saved in Word document .....	157
Figure 6.15: Site for answering questions (AUS7_.....	158
Figure 6.16: Completed task by AUS7 saved in Word document .....	158
Figure 6.17: Site for answering questions (AUS3) .....	159
Figure 6.18: Site for answering second question (AUS3).....	160
Figure 6.19: Site for answering third question (AUS3) .....	160
Figure 6.20: Completed task by AUS3 saved in Word document .....	161
Figure 6.21: Site for answering questions (AUS4) .....	162
Figure 6.22: Site for answering questions (AUS4) .....	163
Figure 6.23: Completed task by AUS4 saved in Word document .....	163
Figure 6.24: Site for answering questions (AUS21) .....	165
Figure 6.25: Completed task by AUS21 saved in Word document .....	167
Figure 6.26: Site for answering questions (MSIA1) .....	173
Figure 6.27: Completed task by MSIA1 saved in Word document .....	174
Figure 6.28: Site for answering questions (MSIA2) .....	176
Figure 6.29: Completed task by MSIA2 saved in Word document .....	176
Figure 6.30: Site for answering questions (MSIA3) .....	178
Figure 6.31: Site for answering questions (MSIA3) .....	178
Figure 6.32: Site for answering questions (MSIA3) .....	179
Figure 6.33: Completed task by MSIA3 saved in Word document .....	179
Figure 6.34: Site for answering questions .....	181
Figure 6.35: Completed task by MSIA4 saved in Word document .....	182
Figure 6.36: Completed task by MSIA5 saved in Word document .....	184
Figure 6.37: Completed task by MSIA6 saved in Word document .....	185
Figure 6.38: Completed task by MSIA7 saved in Word document .....	186

Figure 6.39: Completed task by MSIA18 saved in Word document .....	186
Figure 6.40: Completed task by MSIA29 saved in Word document .....	186
Figure 6.41: Completed task by MSIA8 saved in Word document .....	187
Figure 6.42: Completed task by MSIA8 saved in Word document .....	188
Figure 6.43: Site for answering questions (MSIA10) .....	189
Figure 6.44: Site for answering questions (MSIA10) .....	190
Figure 6.45: Site for answering questions (MSIA10) .....	190
Figure 6.46: Completed task by MSIA10 saved in Word document .....	191
Figure 8.1: Adapted information-search processes .....	231
Figure 8.2: Average duration based on task (Malaysia and Australia) .....	250
Figure 8.3: Cikgu.Net .....	256
Figure 8.4: Information-seeking process by primary school children in Malaysia and Australia .....	271
Figure 8.5: Input and output elements for the information-seeking process .....	280
Figure 9.1: Modified model of information-seeking process .....	299

## List of tables

Table 1.1: Kuhlthau's information-seeking process model (1993) .....	6
Table 2.1: Top ten ancestry responses for the 2006 Census .....	16
Table 2.2: Tabulation of school education between states and territories in Australia .....	22
Table 2.3: Total distribution of government schools, students and teachers in Malaysia .....	26
Table 2.4: Characteristics of high and low context cultures .....	37
Table 3.1: Summary of information-seeking models .....	58
Table 3.2: Description of phases based on Kuhlthau's model (1993).....	62
Table 3.3: Elements in the conceptual framework .....	67
Table 4.1: Respondents from Malaysia and Australia .....	103
Table 4.2: Categories of information-seeking processes.....	109
Table 5.1: School children's backgrounds by age, gender, and school in Malaysia and Australia.....	112
Table 5.2: School children's experiences.....	113
Table 5.3: School children's knowledge, usage, challenges of using the Internet .....	116
Table 5.4: Ranks for each sample in accordance with its respective variable (purpose).....	119
Table 5.5: Results for non-parametric analysis using the Mann-Whitney U test.(purpose) .....	120
Table 5.6: Ranks for each sample in accordance with its respective variable (type of subject) .....	123
Table 5.7: Results for non-parametric analysis using the Mann-Whitney U test (type of subject) .....	123

Table 5.8: Ranking of sources for assistance to primary school children from Malaysia and Australia in finding information on the Internet .....	126
Table 5.9: Ranks for each sample in accordance with its respective variable (challenges).....	128
Table 5.10: Results for non-parametric analysis using the Mann-Whiney U test (challenges).....	128
Table 5.11: Favourite search engine.....	130
Table 5.12: Frequency of variable information-seeking for academic purpose of school children in Malaysia and Australia .....	130
Table 5.13: Ranks for each sample in accordance with its respective variable ..	135
Table 5.14: Results for non-parametric analysis using the Mann-Whitney U test .....	136
Table 6.1 Tasks given by teachers.....	139
Table 6.2: Details of two schools in Austalian case study .....	141
Table 6.3 School children's ID, age, grade, gender, task and time taken – Case Australia .....	144
Table 6.4: Thematic analysis of Case Australia from primary school children observations .....	168
Table 6.5: Details of two schools in Malaysian case study.....	170
Table 6.6: School children's ID, age, grade, gender, task and time taken – Case Malaysia .....	172
Table 6.7: Thematic Analysis of Case Malaysia from primary school children observations .....	192
Table 6.8: Thematic Analysis of Case Australia and Case Malaysia from primary school children observations .....	193
Table 7.1: Details of teachers interviewed in Australian case study.....	195
Table 7.2: Thematic analysis of Case Australia from teachers' perspectives .....	207
Table 7.3: Details of teachers interviewed in Malaysian case study.....	208
Table 7.4: Thematic analysis of Case Malaysia from teacher perspectives .....	226

Table 7.5: Thematic analysis of Case Australia and Case Malaysia from teacher perspectives .....	227
Table 8.1: Observations of information-seeking processes at the initiation stage .....	236
Table 8.2: Observations of information-seeking processes at the selection stage .....	243
Table 8.3: Observations of information-seeking processes at the exploration stage .....	246
Table 8.4: Observations of information-seeking processes at the formulation stage .....	247
Table 8.5: Observations of information-seeking processes at the collection stage .....	248
Table 8.6: Observations of information-seeking processes at the presentation stage .....	249
Table 8.7: Thematic analysis from observations of children and teacher interviews .....	264
Table 8.8: Key features of information-seeking Process among primary school children in Malaysia and Australia .....	283
Table 9.1: ISP element - input (users) .....	288
Table 9.2: ISP element - input (Internet usage).....	288
Table 9.3: ISP element - input (task/assignment).....	290
Table 9.4: ISP element - process (information seeking process) .....	291
Table 9.5: ISP element - output (information seeking process) .....	293

# **1 Overview and Context of the Research**

## **1.1 Introduction**

This study was conducted to explore information-seeking processes among primary school children using the Internet in a school setting. This chapter outlines the rationale for the research, describes the importance of information-seeking for primary school children, and articulates the research problems. The research objectives and questions are then discussed, followed by a description of contribution to knowledge. The chapter concludes by outlining the organisation of the thesis.

## **1.2 Rationale for the Research**

Children's access to information has been improving as information resources move from print to online. Nowadays, in all types of schools, the curriculum has been integrated with online learning in order to meet the demands of the information and knowledge age. The online information retrieval systems currently available for modern libraries and schools include online catalogues, library resource sharing network systems, CD-ROMS and online searching of networked databases. Many schools are equipped with the Internet to support the teaching and learning process. In this research I focus on the use of the Internet by primary school children in Australia and Malaysia when seeking information for academic purposes. The study is based within two Victorian primary schools and two primary public schools in Malaysia's 'Smart Schools' program used to explore how school children seek information from the Internet for academic purposes. Both Australian and Malaysian governments have embedded information and communications technologies (ICT) in their curriculum at schools. The vision for integrating ICT into learning includes the use of current information retrieval systems to support education in the information age. There is a need for this

research examining the information-seeking processes of school children in order to design the most appropriate information retrieval systems for children to use effectively. This will support the integration of ICT into children's learning

Students use computers and access the Internet for their school assignments and also for personal purposes. Hirsh (1999), Large, Beheshti and Rahman (2002) and Madden et al. (2007) point out that children are increasingly using electronic resources to support their information needs; therefore, understanding the ways children use electronic resources has implications for information literacy. American Library Association, (American Library Association Presidential Committee on Information Literacy, Final Report, 1989, p.1) defined information literacy skills as "be able to recognize when information is needed and have the ability to locate, evaluate and use effectively the needed information".

Soeters and Schaik (2006) found in their study that almost 50% of children had had a negative experience on the Internet, such as exposure to online pornography and violence, and computer viruses. In these situations, teachers or teacher-librarians need to guide and teach various information-seeking strategies to help students, especially primary school children, acquire the information they need and assist them to avoid inappropriate information. This research focus on the academic use of the Internet by primary school children in two countries, Australia and Malaysia. Research is needed to examine the information-seeking processes of primary school children and how they address their information needs. This study will provide teachers and teacher-librarians with an understanding of information-seeking processes among primary school children and make recommendations to information technology specialists regarding design elements of information retrieval systems for primary school children. This research focuses on how children seek information within a school context, particularly the processes undertaken when searching for information to solve tasks given by teachers.



### **1.3 Problem Statement**

Most information retrieval systems have been designed for adult users but there are studies which have examined young people's information-seeking perspectives (Abels & Danuta, 2004; Choo et al., 1999; Chung & Neuman, 2006; Dresang, 2005; Eskola, 1999; Shenton, 2004). Studies undertaken by Kuhlthau (1991), Walter (1994), Borgman et al. (1995), Hirsh (1999) and Xie (2008) have indicated that children's information-seeking behaviours are different to those of adults. Given the cognitive, experiential and skill-level differences between adults and children, children need appropriate information retrieval tools that are designed to meet their academic information needs. Large and Beheshti (2000), in their research involving two grade six classes aged 12 years old, found that students had problems in finding information on the web for their school projects. They needed more helpful interfaces to assist them in search formulations. Bilal (1999) compared three search engines that were considered suitable for children - Yahoo!igans!, Ask Jeeves for Kids, and Super Snooper - and found accessing information through these search engines was not necessarily easy for children.

Children have issues with planning and creating search queries when using electronic resources (Nesset, 2009) and factors such as ability of the students, guidance and Internet experience shape a child's search success (Madden, et al. 2007). Broch (2000) found that some important issues should be highlighted in children's interface design, including Internet filters, authorship and Internet skills in searching information. In order to design more appropriate information retrieval systems that children can effectively use, we need to understand how children actually seek information in electronic environments. Studies of this nature have not been carried out in Australia or Malaysia. In summary, there is limited research into the information-seeking processes of children (Shenton, 2008) and studies of children have tended to focus on their information-seeking strategies rather than their information-seeking processes. The information-seeking process can be defined as a process of searching, obtaining and using information for a purpose when a person does not have sufficient prior knowledge

(Vakkari, 1999). Meanwhile information seeking strategies is a part of information-seeking process which explain what strategies does information seeker do in order to seek information. For example Kuhlthau's (1993) identified six stages of information search process (ISP) with each stage encompassing three aspects: cognitive /thoughts (what is to be accomplished), affective/feelings (what the searcher was feeling), and actions/physical (what the searcher did) or strategies/ physical (what the searcher trying to achieve). This then identifies the objectives and associated research questions for this research.

### **1.4 Research Questions**

This research focuses on two main questions:

1. What are the processes undertaken by school children when searching for information for academic purposes from the Internet?
2. What are the success factors and challenges that primary school children face when searching for information from the Internet for academic purposes?

### **1.5 Research Objectives**

The objectives of this research are:

- To identify the processes undertaken by school children when searching for information for academic purposes from the Internet.
- To identify the success factors and challenges that primary school children face when searching for information from the Internet for academic purposes.

## **1.6 Research Methodology and Approach**

This study uses a case study research approach to identify school children's information-seeking processes for academic purposes based on the research questions posed in this study. A mixed methods approach was used to gather both qualitative and quantitative data. The quantitative approach was employed to gather data about the background of primary school children, and about usage, knowledge and challenges of using the Internet for academic purposes to acquire a broad overview of the phenomena. Next, the qualitative approach focused on observation to gain more detailed information, such as how school children seek information using the Internet. Finally, qualitative data was obtained through interviews to get the views of teachers on how primary school children seek information. The combination of both quantitative and qualitative techniques involved triangulation and cross-case analysis to support the research findings. Overall, multiple sources of evidence were used in this research as data was obtained from school children using questionnaires and observations, as well as interviews with teachers. See chapter 4 for details.

The research is based on the pragmatism paradigm (Creswell & Plano Clark, 2011; Saunders et al., 2009; Onwuegbuzie et al., 2006). Pragmatism is typically associated with mixed methods research. The focus is on the question asked and the problems under investigation are informed by the use of multiple methods. For this research, various data collection techniques were used such as questionnaires, observations and interviews to gain a richer understanding of the context of the research.

### 1.6.1 Conceptual Framework

Previous research has been undertaken on information-seeking behaviour and some models are available for investigation (Wilson, 1999; Ellis, 1989; Marchionini, 1995; Johnson, 2003; Kuhlthau, 1993). After careful consideration, the model proposed by Kuhlthau (1993) was chosen as the conceptual framework for the present study. In Kuhlthau's model, six sub-processes were developed, as described in Table 1.1.

Stages in Information-seeking processes	Feelings associated with each stage	Thoughts associated with each stage	Actions associated with stage	Appropriate task according to Kuhlthau's model
Initiation	Uncertainty	General	Seeking background information	Recognise
Selection	Optimism			Identify
Exploration	Confusion		Seeking relevant information	Investigate
Formulation	Clarity	Narrow/clearer		Formulate
Collection	Sense of direction/confidence	Increased interest	Seeking focused information	Gather
Presentation	Relief/satisfaction/disappointment	Clearer/focused		Complete

**Table 1.1: Kuhlthau's Information Search Process model (1993)**

In Kuhlthau's model, a relationship between information-seeking and learning is observed. She identifies the stages of information-seeking related to affective feelings, cognitive thoughts and physical actions in the learning process. The six stages in the Kuhlthau (1993) model can be described as follows. The first stage is "initiation", where a person has a need for information. At this stage, a person may feel uncertainty and their thoughts are classified as 'general'. In the "selection" stage, a person tries to identify a general topic in order to search for the information and there is a sense of optimism. The third stage is "exploration", where a person tries to investigate or search for more information on the topic.

However, too much information can make them confused. In the "formulation" stage, a person will focus on a specific area within the topic and seek more clarity as they narrow down their search. The next stage is "collection", when a person tends to feel more confident as they gain a sense of direction for their information-seeking. Finally, at the "presentation" stage, a person completes the information search or task and satisfaction is dependent on the final information acquired. This framework was adopted to guide the methodology and instruments for the present research. Kuhlthau's model was used to identify the information-seeking processes undertaken by school children for their academic purposes and, in particular, to answer the first research question "What are the processes undertaken by school children when searching for information for academic purposes from the Internet?"

### **1.7 Key findings**

The key findings of this study are that, in relation to school children, cognitive and action stages were seen as relevant to the information-seeking processes in order to complete their assignments. The teachers focussed more on the actions associated with information-seeking processes as being most relevant to learning; that is, actions such as how to use the Internet and how to synthesise, organise and evaluate the information found, whereas Kuhlthau's model of ISP did not integrate information skills or literacy into her model. New sub-themes were derived and assessment stages and feedback were incorporated into Kuhlthau's model.

### **1.8 Contribution of Research**

Limited research has been carried out to explore the information-seeking processes of children. My research will contribute to the body of knowledge and make a practical contribution through recommendations to the relevant

departments of education in Australia and Malaysia. In particular, the recommendations will be beneficial for librarians and information technology specialists regarding the design elements of information retrieval systems and online materials for primary school children, specifically for academic purposes. Results gained from this study will provide an understanding of the children's information seeking for teachers, librarians, policy makers and web/program designers.

This study is important, as the results will provide recommendations about the information seeking and behaviour of primary school children to the Ministries of Education, for both countries, Australia and Malaysia. Teacher competencies are also crucial for their teaching in order to ensure children are successful information seekers for their learning. There is also a positive indication in the study by Kamal and Othman (2012) that students in Malaysian primary and secondary schools benefit from the contributions of library and media teachers. The majority of the respondents agreed that their library and media teachers are helpful when searching for information and can respond to their problems quickly. In Malaysia particularly there are issues regarding the use of the Internet environments in Malay and English Language subjects, and the availability of relevant websites. This study will also contribute insight into the literature about Malaysian children's information behaviour. Very little such research exists, as the tendency has been to focus on adult information needs and behaviours (Zawawi and Majid, 2001).

### **1.9 Key Concepts**

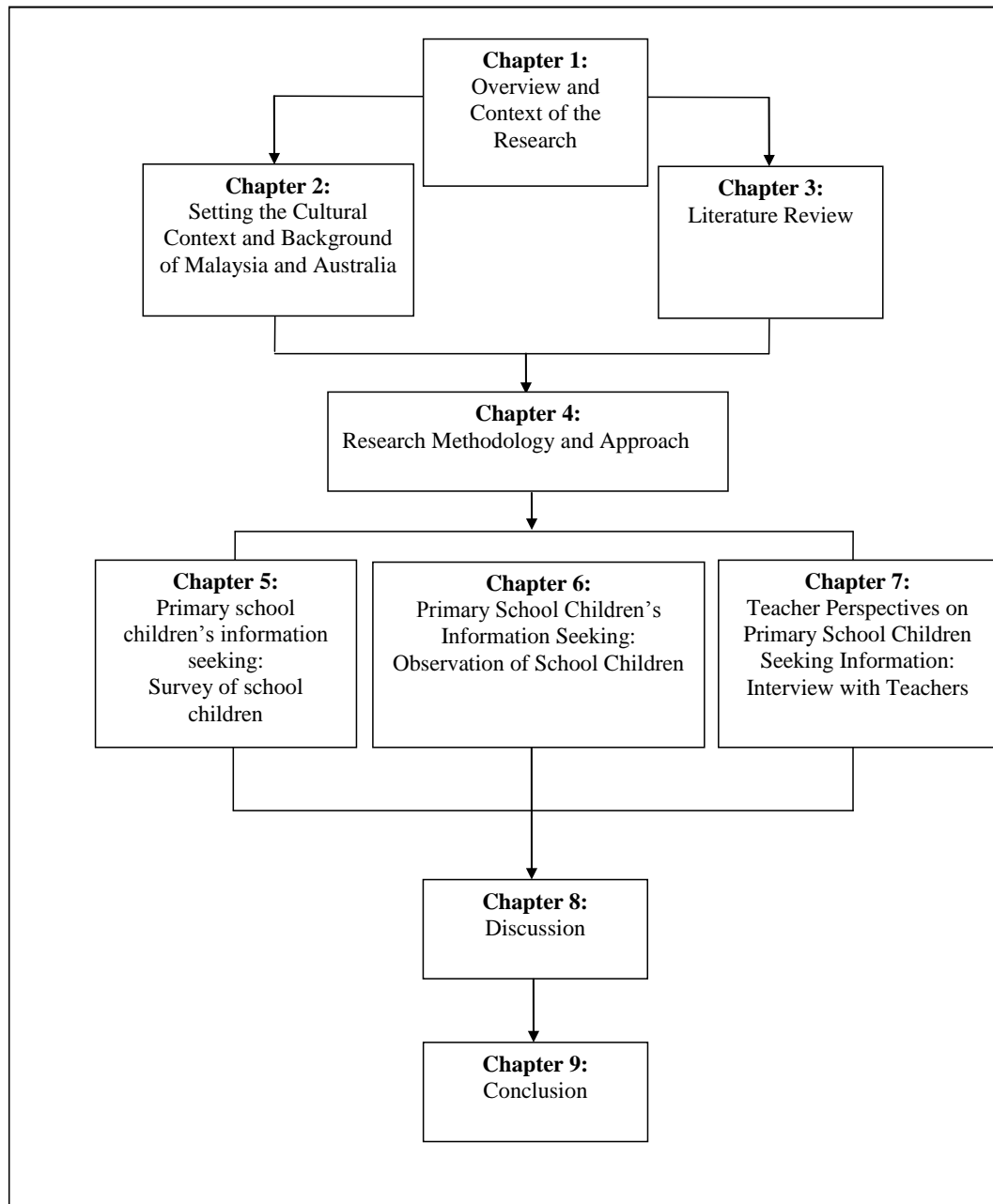
The concepts that outline the key terms explored in this research are:

- i) Information seeking behaviour, according to Case, (2012) is a study on human behaviour in seeking information; for this study it focuses on the behaviour of primary school children in seeking information from the Internet.

- ii) Culture means the whole concept of traditional behaviour, which has been developed by the human race, and it is successively learned by next generation (Birko, et al., 2013). In the context of this study culture aspects have been highlighted as it involved two different countries, Australia.
- iii) Internet is a term that refers to the global networks of public computers running Internet protocols and supports the public World Wide Web (WWW).
- iv) The Word Wide Web or WWW consists of all the public web sites connected to the Internet worldwide, including the client devices (such as computers) that access web content. The WWW is just one of many applications of the Internet and computer networks.

This thesis consists of nine chapters. The overall thesis structure is shown in Figure 1.1.

## 1.10 Organisation of the Thesis



**Figure 1.1: Thesis structure**



The content of each chapter is outlined as follows:

### **Chapter 1: Introduction**

The first chapter provides an overview of the research and explains the rationale related to primary school children's information-seeking needs for academic purposes. It highlights the research problems and presents the research objectives and questions.

### **Chapter 2: Setting the Cultural Context and Background of Australia and Malaysia**

The second chapter presents background information for Australia and Malaysia by providing an overview of the geography, population, ethnic groups, and education systems in both countries.

### **Chapter 3: Literature Review**

The third chapter reviews the literature relevant to the information-seeking process including concepts, elements and conceptual frameworks. The chapter discusses information-seeking from children's perspectives, and the link between education systems and culture.

### **Chapter 4: Research Methodology and Approach**

The fourth chapter discusses the research approach of this thesis. This chapter discusses in detail the mixed methods approach used as a strategy in the research. Relevant topics such as research design, data collection techniques, procedure, data analysis, validity and reliability and ethics are addressed. The chapter concludes with an overview of the selection of participants.

### **Chapter 5: Primary School Children's Information Seeking: Survey of School Children**

The fifth chapter describes the findings from the quantitative data which were derived from the survey questionnaires. This chapter presents the descriptive findings that were gathered from the questionnaires such as frequencies, cross-tabulation, and graphs, further analysis such as the Mann-Whitney U test was carried out to test any significant differences between Australia and Malaysia primary school children seeking information from the Internet.

### **Chapter 6: Primary School Children's Information Seeking: Observation of School Children**

The sixth chapter describes the qualitative findings resulting from one-to-one observation of primary school children. The use of Kuhlthau's model is explained. The findings from the observations start with a narrative analysis of primary school children seeking information from the Internet and later the elaboration of the findings using statistical analysis.

### **Chapter 7: Teacher Perspectives on Primary School Children Seeking Information: Interview With Teachers**

The seventh chapter discusses the findings of the qualitative data derived from the interviews with teachers. The findings were analysed based on the six stages of Kuhlthau's model. Teachers explain how children seek information in the class and what challenges primary school children face when dealing with the Internet.

### **Chapter 8: Discussion**

The eighth chapter provides a detailed discussion of the research findings presented in Chapters Five, Six and Seven, which involved the cross-case analysis. It summarises the findings of the research questions that were derived from the thematic analysis of Kuhlthau's model to demonstrate the information

seeking-processes of primary school children in both countries, Australia and Malaysia.

### **Chapter 9: Conclusion**

The ninth and final chapter presents a summary of the whole thesis. This chapter includes limitations and recommendations to the departments/ministries of education in Australia and Malaysia, and makes recommendations for further research.

### **1.11 Summary**

This first chapter introduced the study by explaining the context of research into the information-seeking processes of primary school children in Australia and Malaysia. In both countries, primary schools use ICT, including online environments and the Internet, to support their teaching and learning processes. The problem statement, research objectives and conceptual model provided in this chapter guide the whole process of the research. The expected contribution of this research to primary school education in both countries was explained and the overall organisation of the thesis was provided.

The next chapter discusses the background of Australia and Malaysia in relation to the geographical, demographic, and educational context. This background informs a comparison of education systems in Australia and Malaysia.

## **2      Setting the Cultural Context and Background of Australia and Malaysia**

### **2.1      Introduction**

This research focuses on two countries, Australia and Malaysia. It is necessary to provide some background information on these two countries to articulate the context for the research. This chapter covers aspects of each country's geography, population, culture, ethnicities and political and economic systems. As my research involves primary school children, an explanation of the education system in both countries is also provided. The discussion of primary school education in both countries includes an overview of the schooling systems and the curriculum structures, with specific emphasis on the use of Information Communication & Technology (ICT) and the Internet within the school environment, and also the influence of culture on education.

### **2.2      Australia**

Australia, officially referred to as the Commonwealth of Australia, is surrounded by the Indian and Pacific Oceans, and separated from Asia by the Timor and Arafura Seas. Australia consists of six states (New South Wales, Queensland, South Australia, Tasmania, Victoria and Western Australia), and two federal territories (the Australian Capital Territory and the Northern Territory) (Figure 2.1).



**Figure 2.1: Map of Australia**

([http://www.street-directory.com.au/sd\\_new/home.cgi](http://www.street-directory.com.au/sd_new/home.cgi))

Australia is the 50th most populated country in the world with a population of 22.6 million people of mixed descent (CIA, The World Factbook, 2011). About 90% of Australia's population is of European descent, and 8% is from Asia (predominantly of Chinese, Vietnamese, Filipino and Indian descent). The abolition of the White Australia Policy in the mid-1970s led to a significant increase in non-European immigration, mostly from Asia and the Middle East. There was an estimated indigenous population of 517,200 people or 2.5% of the total Australian population as of 30 June 2006 (Australia Bureau Statistics, 2006 Census). In Australia, the term "indigenous" refers to persons who identify themselves as being Aboriginal or Torres Strait Islander, descendants of the original population (ABS, 2006).

One of the main objectives of the 2006 Census was to identify the ancestry of the Australian population. Ancestry was established through an individual's birthplace, language and religion, or an indication of the individual's ethnic background, particularly for recent arrivals in Australia. Table 2.1 shows the top ten ancestry responses for the 2006 Census (The latest census information available from the ABS during the time of investigation).

Ancestry	2006
Australian	7 371 823
English	6 283 647
Irish	1 803 736
Scottish	1 501 200
Italian	852 421
German	811 543
Chinese	669 901
Greek	365 150
Dutch	310 082
Indian	234 720

**Table 2.1: Top ten ancestry responses for the 2006 Census**

(Australia Bureau of Statistics, 2006 Census)

The 1991 Census had revealed English as the main language spoken in homes and Italian as the most common “other” language used. However, by the 2001 Census, Chinese had become the most common non-English spoken language and this trend remained the same for the 2006 Census. From the 2006 Census, the patterns of languages spoken were English 78.5%, followed by Chinese 2.5%, Italian 1.6%, Greek 1.3%, Arabic 1.2%, Vietnamese 1%, other 8.2% and unspecified 5.7%. With regard to religion in Australia, the 2006 Census showed that Christianity predominated, with 64% of the total population identifying themselves as Christian, 18.7% of Australians declaring “no religion” and 11.2% did not answer the question. The remaining population is a diverse group that includes religions such as Islam, Buddhism, Hinduism and Judaism.

### **2.2.1 Political and Economic Systems in Australia**

Australia is known as a constitutional monarchy with a queen or king as its head of state, similar to Malaysia, but in Australia the powers are limited by a constitution. The current Queen, Elizabeth II, plays no direct role within the Australian political system and is represented by a Governor-General. Australia's political system is democratic, and includes freedom of speech and religious tolerance. The Commonwealth, or national government, was established on January 1, 1901 when the existing separate colonies were federated by the British Crown. The Australian system of government follows the principles of the British Westminster system. The Australian Constitution provides for three powers: legislative, executive and judicial. The legislative arm of government is the parliamentary system, which consists of the Senate and the House of Representatives, and has the power to make laws. The executive branch of government is headed by the Prime Minister of Australia who holds the executive power of state and administers the laws made by the legislative branch. The judicial branch represents the High Court and other federal courts which interpret the laws of the Commonwealth.

As reported in the Central Intelligence Agency World Factbook, 2010, the economy of Australia is developed, advanced and mature with a Gross Domestic Product (GDP) of approximately AUD\$1.6 trillion. Agriculture is an important source of export earnings for Australia, particularly the wheat, cattle and dairy industries. Australia's largest export markets are Japan, China, South Korea, India and the United States (US). Other main industries are mining, industrial, education, transportation equipment, steel, fishing, brewing, wine and tourism.

## **2.3 Malaysia**

Malaysia is located in South East Asia (Figure 2.2), and is governed according to a parliamentary and federal constitution. Its land borders are shared with Indonesia, Thailand, Brunei, Vietnam, the Philippines and Singapore. Malaysia is

comprised of two regions separated by the South China Sea – Peninsular/West Malaysia and East Malaysia (Figure 2.2). Peninsular/West Malaysia consists of 11 states (Perlis, Kedah, Pulau Pinang, Perak, Pahang, Selangor, Negeri Sembilan, Melaka, Johor, Kuala Terengganu and Kelantan) and two federal territories (Kuala Lumpur and Putrajaya). East Malaysia consists of two states – Sabah and Sarawak – and the federal territory of Labuan.



**Figure 2.2: Map of Malaysia**

(<http://www.malaysia-maps.com/>)

Malaysia is the 43rd most populated country in the world with a total population of 27.5 million people of mixed-ethnic background (CIA, The World Factbook, 2011). The main ethnic groups are the Malays (50.4%), Chinese (23.7%), Indigenous (11%) and Indians (7.1%) (CIA, The World Factbook, 2011). The Malays and the Indigenous people who live on the Peninsular and the Indigenous people of East Malaysia are known as bumiputeras (meaning “sons of the soil”), while the Chinese and Indians are referred to as non-bumiputeras. There are more than twenty indigenous tribal groups in Malaysia and they are considered as minorities based on their population numbers. The main indigenous tribes are the Ibans and the Bidayus of Sarawak. Another indigenous tribe is known as the Orang Asli, whose people live in small, scattered groups across Peninsular Malaysia. These indigenous tribes have equal rights as other Malaysian citizens in



their choice of religion, ownership of property and education (Azhar, Azharudin, Suffian & Zulkanain, 2000). The Chinese and Indian ethnic groups came to Malaysia in the nineteenth century and the first half of the twentieth century (Information Malaysia 2002 Yearbook, 2002).

While Malaysia is a multi-cultural society, Islam is the national religion and more than half of the population are Muslims. According to the Population and Housing Census of 2000 (CIA, The World Factbook, 2011), the statistics for religions in Malaysia were: 60.4% Islam; 19.2% Buddhism; 9.1% Christianity; 6.3% Hinduism; 2.6% Confucianism, Taoism and other traditional Chinese religion; 1.5% other faiths, including animism, folk religion and Sikhism; and 0.9% reported having no religion or did not provide any information. The Malay language, known as Bahasa Malaysia, is the national and official language of the country.

### **2.3.1 Political and Economic Systems in Malaysia**

Malaysia is a Federal Constitutional Monarchy where the king, the Yang Di Pertuan Agong (YDPA) is also the Head of State. The position of the YDPA is subject to the Malaysian Constitution and the position is rotated every five years. The Conference of Rulers of the nine states of Peninsular Malaysia is responsible for electing one of its rulers to serve as king. The king is also the leader of the Islamic faith in Malaysia. In 1983, the Prime Minister of the time, Mahathir Mohammed, passed constitutional authority that removed the ruler's personal legal immunity; thus, although the YDPA is the head of state, he is obliged to act in accordance with the government's advice.

The parliamentary system in Malaysia follows the principles of the British Westminster system. The parliamentary system consists of the Dewan Negara (Senate) and the Dewan Rakyat (the House of Representatives). The Dewan Rakyat functions as the main legislative power, passing bills which are to be transmitted to the Senate and finally consented to by the YDPA.

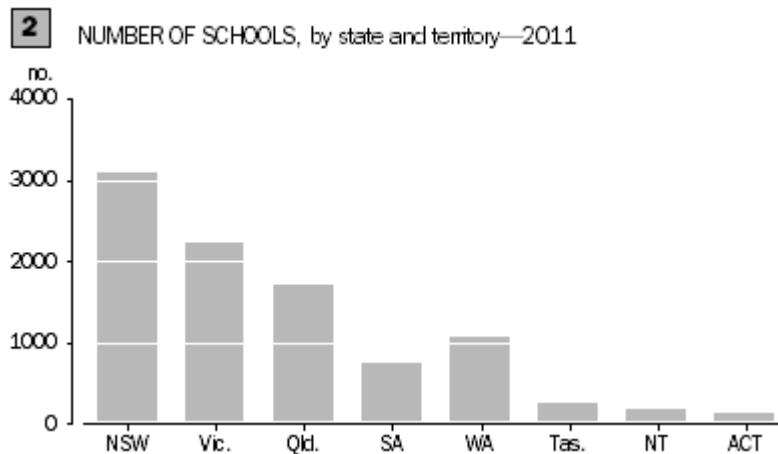
The Prime Minister of Malaysia holds the executive power of state and acts as the head of government. The Prime Minister is elected from the Dewan Rakyat and is often the head of the political party that wins at least two-thirds majority in parliament as a result of the general elections. The Prime Minister chooses cabinet members from members of parliament who are appointed by the YDPA. The members of the Dewan Negara are elected to parliamentary terms lasting up to five years, unless a general election is conducted earlier.

The Malaysian legal system is based on British common law inherited from the colonial period. The Malaysian Constitution gives an independent judiciary the power to pronounce on the constitutionality and legality of executive acts. The legal system in Malaysia consists of subordinate courts (magistrate courts and session courts) and superior courts. The superior court consists of the High Court of Malaya, the High Court of Sabah and Sarawak, the Court of Appeal and the Federal Court. The Federal Court reviews decisions referred from the Court of Appeal. The Chief Justice presides over the Federal Court, whereas the presidents of the two High Courts are called Chief Judges. There is another distinctive court system called the Syariah court which deals with Islamic matters.

Since the mid-1970s, Malaysia has had one of the most dynamic and fastest-growing economies in Asia (The Far East and Australasia, 2009). Malaysia is well-endowed with natural resources in areas such as agriculture, forestry and minerals. Malaysia is one of the top exporters of natural rubber, palm oil and the most valuable exported resource is petroleum. Late in 1998, Malaysia experienced a substantial shift in economic growth, moving from an agricultural economy to an industrial one. The majority of Malaysian manufacturing operations are small and medium enterprises (SMEs) that focus on textile, apparel, food and beverage, and resource-based industries.

## 2.4 The Education System in Australia

Education in Australia is monitored by the Ministries of Education in the various states and territories. Schools include government schools and non-government schools, including religious schools such as Catholic or Islamic schools. According to the Australian Bureau of Statistics (2011), there were 6,705 government schools (71%), 1,710 Catholic schools (18%), and 1,020 Independent or non-government schools (11%) in 2011 with a total 9,435 schools. Of this total number, there were 6,312 primary schools, 1,396 secondary schools, 1,305 combined primary/secondary schools, and 422 special schools in Australia. The graph below shows the number of schools by states and territories in 2011.



**Figure 2.3: Number of schools by states and territories in 2011**

(Australian Bureau of Statistics, 2011 retrieved at <http://www.abs.gov.au/ausstats/abs@.nsf/Lookup/4221.0main+features202011>)

School education is compulsory between the ages of 6 and 16 (Years 1 to 10) and comprises a possible 13 years in total in Australia. Education in Australia is different from that of Malaysia, in that the school systems vary between states and territories. However, in general schooling includes:

A preparatory year before Year 1: not compulsory but almost universally undertaken:

- Primary schooling for 6 or 7 years – Years 1-6 or (1-7 if students attend a preparatory year and depending on the state or territory)
- Secondary schooling for 5 or 6 years – Years 7-12 or 8-12
- Post-secondary education is offered in the higher education sector or vocational education or training sectors.

(Department of Education and Early Childhood Development, 2011)

There are small differences in the Victoria school education between states and territories as shown in Table 2.2.

State or Territory	Pre-School	Preparatory Year (First Year)	Primary School	Secondary School
ACT	Pre-School	Kindergarten	Years 1-6	Years 7-12
NSW	Pre-School	Kindergarten	Years 1-6	Years 7-12
NT	Pre-School	Transition	Years 1-7	Years 8-12
QLD	Pre-School	Preparatory	Years 1-7	Years 8-12
SA	Pre-School	Reception	Years 1-7	Years 8-12
TAS	Kindergarten	Preparatory	Years 1-6	Years 7-12
VIC	Pre-School	Preparatory	Years 1-6	Years 7-12
WA	Kindergarten	Pre-Primary	Years 1-7	Years 8-12

**Table 2.2: Tabulation of school education between states and territories in Australia**

(Ministry of Education, Australia)

### **2.4.1 Overview of Primary Education in Victoria, Australia**

Education is compulsory in Australia, from age 5 or 6 to 15-17 years of age depending on the state or territory. The curriculum for Australian primary school education emphasises developing the English language, literacy skills, numeracy, integrated studies, health and creative activities. The education system in Australia is different from that of Malaysia as there are no standard examination requirements at primary school level. Students' progress to secondary school is based on the completion of seven years of primary school. The National Assessment Program for Literacy and Numeracy (NAPLAN), testing students in Years 3, 5, 7 and 9, has been implemented in all states and territories of Australia. This program assesses students' skills in four areas: reading, writing, language conventions (spelling, punctuation and grammar) and numeracy. These skills are important for academic success and for future development.

The Victoria education system is monitored by the Department of Education and Early Childhood Development (DEECD). The Department is responsible for monitoring both government and non-government schools and monitors schools indirectly through regulating and funding of the schools. The mission of the Victorian education system is to “ensure a high-quality and coherent birth-to-adulthood learning and development system to build the capability of every young Victorian” (DEECD, 2011, para 3). There are three stages of learning as part of the Victorian Essential Learning Standards (VELS):

- Prep to Year 4 – children will develop literacy skills and knowledge, including physical and social capacities, which will form the basis of their future learning
- Years 5 to 8 – children will progress beyond the foundations built in the previous stage to develop their literacy and numeracy skills
- Years 9 and 10 – students will develop greater independence and will begin to develop preferred areas of interest for their learning.

The primary school curriculum in Victoria particularly emphasises literacy and numeracy skills in the early years. At the same time, there is also an introduction to Information and Communication Technology, English, Mathematics, Art and Physical Education within the curriculum. In Years 3 and 4, more subjects are studied, including Science, Humanities, Technology, and Civics and Citizenship. In Years 5 and 6, languages other than English, History, Geography, Economics and Communication are introduced. (<http://www.education.vic.gov.au/school/parents/primary/Pages/preptoyear4.aspx>)

Schools across Victoria have integrated ICT into their curriculum as a way to increase student computer literacy, and to share knowledge and information creatively. There are three main areas in the ICT Domain of the Victorian Essential Learning Standards (VELS), as follows (DEECD, 2011):

1. ICT for visualising thinking: students use ICT to develop and represent their thinking visually.
2. ICT for creating: students use ICT to create problem solutions and information products, ranging from simple to more complex ones.
3. ICT for communicating: students learn how to use online environments and tools to research, communicate and share information and knowledge.

## 2.5 The Education System in Malaysia

Education in Malaysia is monitored by the federal government's Ministry of Education. The mission of education in Malaysia is to "develop a world class education system that discovers the prospective of individuals and accomplishes the aspiration of the Malaysian nation" . (National Education Policy, 2012, p. 3) The national curriculum, under the 1996 Education Act, specifies "an educational programme that includes curriculum and co-curricular activities which encompasses all the knowledge, skills, values, cultural elements and beliefs to help develop a pupil fully with respect to the physical, spiritual, mental and

emotional aspects as well as to inculcate and develop desirable moral values and to transmit knowledge”. According to the National Education Policy (2012, p.3), the main objectives of education in Malaysia are:

- To produce loyal and united Malaysians
- To produce individuals who are devout, honourable, knowledgeable, competent and contented
- To provide manpower [sic] for the development needs of the nation
- To provide educational opportunities to all Malaysians.

The National Education System consists of:

1. Pre-school education (4-6 years of age).
2. Primary education (7-12 years of age) for a duration of six years. At the end of Year 6 students are required to sit for a Primary School Assessment (UPSR or “Ujian Penilaian Sekolah Rendah”). However, from 2011, students who enrolled in Year 1 will be exempted from UPSR examination since a new curriculum for primary school has been introduced – known as Kurikulum Standard Sekolah Rendah (KSSR). The primary school curriculum is being transformed to improve the school program. A core concept of the KSSR is a form of classification of fields of knowledge, skills and values. (<http://www.moe.gov.my/bpk/v2/kssr/>)
3. Secondary education (13-17 years of age) for a duration of five years. Students are required to sit two examinations: Lower Secondary Assessment (PMR or “Penilaian Menengah Rendah”) and Malaysian Certificate of Examination (SPM or “Sijil Pelajaran Malaysia”).
4. Post-secondary education is education for individuals who have completed secondary education with the SPM but not higher education. Students aiming to enter public universities have to complete an additional 18 months of secondary schooling in Form Six and sit for the Malaysian Higher School Certificate (STPM).

As at 2011 there were 9,943 government schools in Malaysia, with 5,244,119 students and 405,716 teachers. The total distribution is shown in Table 2.3.

Level	Schools	Students	Teachers
Primary	7,695	2,899,228	230,449
Secondary	2,248	2,344,891	175,267
Total	9,943	5,244,119	405,716

**Table 2.3: Total distribution of government schools, students and teachers in Malaysia**

(Ministry of Education, 2011)

As the figures in the table show, the number of students in government schools reduces when children reach secondary school age due to a significant number of parents who choose to send their children to private, boarding or Islamic schools.



### **2.5.1 Overview of Primary Education in Malaysia**

Formal education starts at the age of seven when children enter primary school. Primary school is a compulsory form of education in Malaysia where children attend the primary level for six years, progressively moving through Standards 1, 2, 3, 4, 5 and 6. The Standard Curriculum for primary schools is set out under the National Education Policy (2012, p. 3) which aims:

To produce individuals who are balanced, creative, critical and innovative communicators, science and technology, physical and aesthetic development, personal skills, human and spiritual values, attitudes and values based on the Primary School Curriculum Standard and the National Policy.

Primary education is provided for students from the age of 6 to 12 to provide a strong foundation in the areas of reading (Membaca), writing (Menulis), arithmetic (Mengira) (often referred to as the 3M), and reasoning which is an introduction to the basic concepts of science, pre-vocational skills, generic skills and moral values.

Over the six years of primary school, children undertake subjects such as Science, Mathematics, English, Bahasa Malaysia, Islamic Education, Moral Education, Music, Integrated Studies, Arts, and Physical Education. In 2005, the Information Communication and Technology Literacy program was introduced for primary school children. Bahasa Malaysia is the main medium of instruction in national schools, and English is a compulsory subject. The Malaysian education system employs school-based assessment. Under the 2012 National Education Policy, the aim of the school-based assessment system (evaluation and examination) in Malaysia is to serve as an indicator of education quality. Assessment is carried out to obtain information about the level of student learning and to help students improve learning through the information obtained.

Schools in the primary education system are divided into two categories: the national primary schools and vernacular schools. Vernacular schools were established by the Chinese and Indian communities during the British colonial administration (1786–1957) as a consequence of the large number of immigrants from China and India arriving in Malaysia. In 1957, existing Chinese and Tamil schools accepted government funding but were allowed to retain their medium of teaching in the Chinese language for Chinese students and Tamil for Indian students with the condition that they adopt the national curriculum. Vernacular schools (Sekolah Rendah Jenis Kebangsaan - SRJK) use either Chinese or Tamil as the medium of teaching, whereas national primary schools (Sekolah Rendah Kebangsaan) use Bahasa Malaysia as the medium of teaching for all subjects except English. For SRJK schools there is an additional language subject such as Chinese or Tamil.

In this research, primary schools in the Smart School project have been used to explore how school children seek information for academic purposes from the Internet. The formation of the Smart Schools was an aim of the Vision 2020 project that sought to transform the national educational system from memory-based learning to an ICT-enabled or systematically designed system. Eighty-eight Smart Schools were established, only two of which were primary schools. The Smart Schools project also aimed to integrate teaching and learning with IT applications for primary and secondary schools in Malaysia. The main goal of Smart Schools is to prepare students for life in the information age (Malaysian Administrative Modernisation and Management Planning Unit, 2002) and to produce future generations are technologically literate, can think critically and creatively and apply knowledge effectively, in accordance with the National Education Policy.

Three policies have been formulated by the Ministry of Education to transform ICT in education (Curriculum Development Centre, 2005):

1. ICT for all students: the use of ICT by all students.

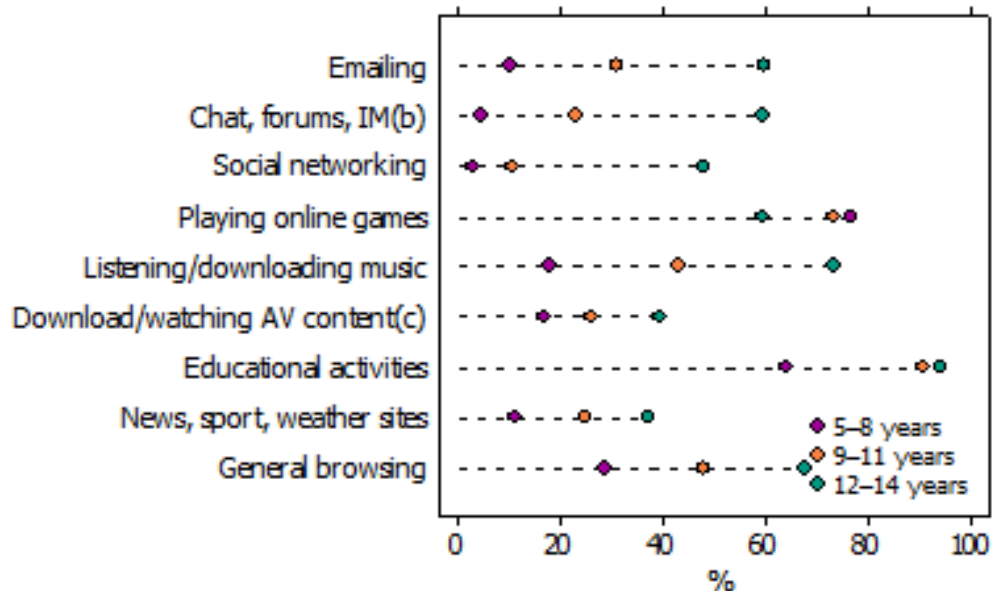
2. ICT in teaching and learning: the use of ICT in education as a learning and teaching tool.
3. ICT in management systems: the use of ICT to increase the productivity and efficiency for management in education.

In Malaysian Smart Schools, at the primary level, students are introduced to the ICT literacy program from Year 1 to Year 6. The program consists of two stages: Stage 1 (Years 1, 2 and 3) which enables students to use basic applications and devices, and Stage 2 (Years 4, 5 and 6) which facilitates mastery of the use of computer applications, Internet skills and web building. In Year 4, primary school students start using computers to access the Internet for school assignments and for personal use. In Year 4, teachers supervise students during the computer classes in order to monitor their use of appropriate methods and approaches. Two teaching periods per week (60 minutes each) of Bahasa Malaysia and English, are allocated to this ICT program. The program is supervised by language teachers (Bahasa Malaysia and English language).

### 2.6 Internet Usage in Australia and Malaysia

Many people have embraced Internet technology in their lives. In Australia, the Australian Bureau of Statistics 2008-09 Multi-Purpose Household Survey indicated that up to April 2009, an estimated 2.2 million children (79%) aged between 5-14 years reported using the Internet. Children accessed the Internet at home, in schools and in other locations. The survey reported that the most popular location for children to access the Internet was at home (at 92%), followed by 86% accessing the Internet in schools, and 45% accessing it from other locations such as public libraries or Internet cafes. From the survey, as shown in Figure 2.4, the most popular use of the Internet was for educational activities. 94% of children aged 12-14 years and 91% of children aged 9-11 years used the Internet at home for educational activities, compared with 64% of 5-8 year olds. The most popular activities via the Internet were educational pursuits (85%), playing online

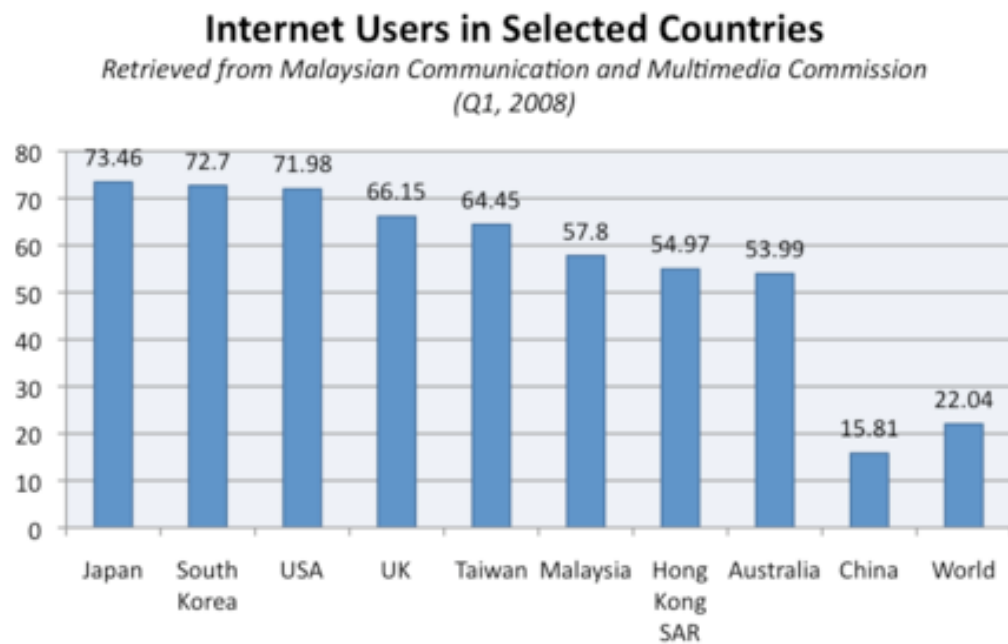
games (69%) and listening to or downloading music (47%). These figures have possibly changed since the survey has been carried out.



**Figure 2.4: Type of Internet activities undertaken at home by child Internet users (2009)**

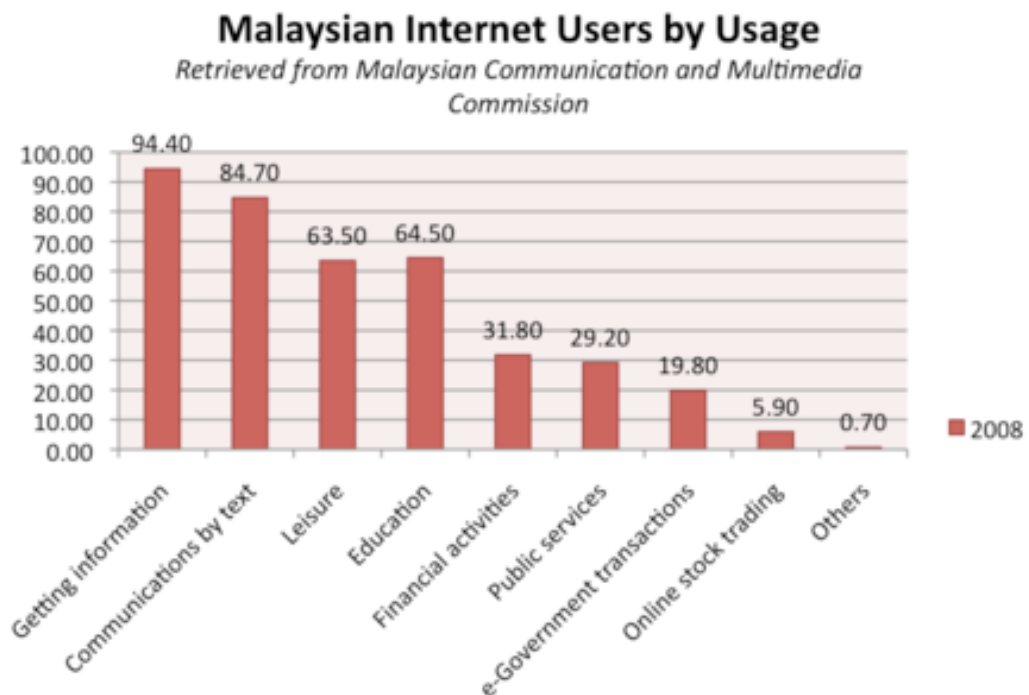
(ABS Children's Participation in Cultural and Leisure Activities, Australia, April 2009 - cat. no. 4901.0)

As shown in Figure 2.5, showing data on Internet use obtained from the Malaysian Communication and Multimedia Commission (MCMC) (2008) or known as Suruhanjaya Komunikasi dan Multimedia Commission (<http://skmm.gov.my>), Malaysia is positioned behind Japan, South Korea, the US, UK and Taiwan with an Internet penetration rate at 57.8%; in Australia, the penetration rate is 53.99%.



**Figure 2.5: Internet users in selected countries (per 100 inhabitants)**

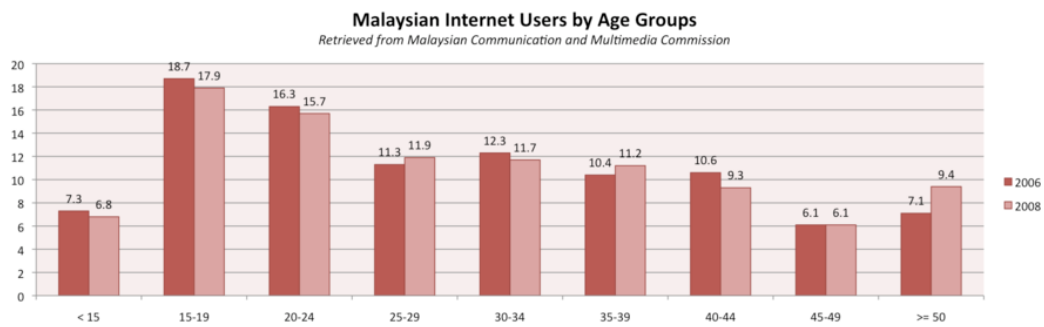
(Malaysian Communication and Multimedia Commission, 2008)



**Figure 2.6: Malaysian Internet users by usage**

(Malaysian Communication and Multimedia Commission, 2008)

As shown in Figure 2.6 above, in 2008, 94.4% of Malaysians used the Internet for the purpose of obtaining information, followed by 84.7% for communication purposes and 64.5% for education purposes. The study by MCMC (2008) suggests that educational bodies in Malaysia have embraced the Internet.



**Figure 2.7: Malaysian Internet users by age group (2006/2008)**

(Malaysian Communication and Multimedia Commission, 2008)

Figure 2.7 above shows that in Malaysia the age group of 15-19 years is the highest Internet user group, followed by the age group of 20-24 years. It illustrates that Malaysian teenagers aged between 15-24 years old show an interest in using the Internet, possibly due to the adoption and access of Internet technology by Malaysian universities and other academic institutions.

### 2.6.1 Internet Usage in Schools

Both Australian and Malaysian governments have embedded information and communication technologies (ICT) into the curriculum in schools. The vision of integrating ICT into the learning systems requires the use of current information retrieval systems to support education in the information age.

In Australia, the Victorian Department of Education and Early Childhood Development, supported by network partner Telstra, provided the VicSmart Broadband Network to all Victorian government schools to increase the speed of Internet access for information sharing across the school system. The system includes student learning, learning and teaching resources and also an education channel (DEECD, 2008). Victorian primary schools use “The Connect” site to link to various websites which provide a variety of games, activities and information that are useful for student projects. However, on January 2010 a new online educational resource was introduced. “The Connect” was upgraded to

“FUSE”. “FUSE”, for Find, Use and Share Education was developed by the Department of Education & Early Childhood Development (DEECD) and digital resources have been contributed by organisations such as the State Library of Victoria, Museums Victoria and Scienceworks. FUSE as in Figure 2.8 below, provides access to relevant, informative and stimulating educational resources from around the world. FUSE has four separate homepages: Connect Early Childhood, Connect Primary, Connect Secondary and Teacher Resources. Students and teachers in Victoria, Australia can search for websites, images, audio as well as other online resources.



**Figure 2.8: Online educational resources (FUSE)**

(<https://fuse.education.vic.gov.au/primary/pages/>)

The SchoolNet project in Malaysia provides broadband Internet access to all schools with the aim of bridging the digital divide, and of being connected internally and globally with access provided at 4Mbps. The Ministry of Education has equipped schools with broadband access, with assistance from the Ministry of Energy, Water and Communication, to ensure that ICT is acculturated. In addition, the Ministry of Education Malaysia provides school with direct links to a few related education sites such as: Federal government sites, education agencies,



## Setting the Cultural Context and Background of Australia and Malaysia

international education organisations, mainstream media and educational portals. Below are two examples of educational portals (Figure 2.9 and Figure 2.10) provided by the Ministry of Education, Malaysia.



Figure 2.9: Education Web TV

(<http://eduwebtv.com/v2/home/>)



Figure 2.10: Education portal

(<http://www.tutor.com.my/>)

## **2.7 Culture and Education**

### **2.7.1 Definition and Elements**

Culture is defined in various ways, for example, Hofstede and Hofstede (1991) perceived that culture is not genetically inherited but is learned or acquired. Another definition is provided by Barnouw (1963, p. 5) who defined culture as “the way of life of a group of people, the configuration of all the more or less stereotyped patterns of learned behaviour, which is handed down from one generation to the next through the means of language and imitation”. Lustig and Koester (2003, p. 27), on the other hand, defined culture as “a learned set of shared interpretations about beliefs, values, and norms, which affect the behaviours of relatively a large group of people”. Kroeber and Kluckhohn (1952, p. 181), in a much earlier study, provided a more comprehensive definition:

Culture consists of patterns, explicit and implicit of and for behaviour acquired and transmitted by symbols, constituting the distinctive achievement of human groups, including their embodiment in artefacts; the essential core of culture consists of traditional (i.e., historically derived and selected) ideas and especially their attached values; culture systems may, on the one hand, be considered as products of action, on the other, as conditioning elements of future action.

### **2.7.2 Elements in Culture**

According to Hofstede and Hofstede (2005), culture consists of four elements: symbols, heroes, rituals, and values. Among these elements, values are considered the core of culture (Lustig & Koester, 2003) and are consistent and stable (Hofstede & Hofstede, 2005). This is due to the fact that values are learned from the beginning of our lives. Values refer to what is considered right and wrong in a society; symbols are representative of a society; heroes are considered as models of behavior; rituals refer to collective activities or socially essential practices. Hall

(1977) added the communication pattern of a culture as another important factor. Hall further refined culture to high context culture or low context culture in the society. The characteristics of high and low context culture are shown in Table 2.4.

<b>High Context Culture</b>	<b>Low Context Culture</b>
Implicit messages	Explicit messages
Internalised messages	Plainly coded messages
Non-verbal coding	Verbalised details
Reserved reactions	Reactions on surface
Distinct in groups and out groups	Flexible in-groups and out-groups
Strong people bonds	Fragile people bonds
High commitment	Low commitment
Open and flexible time	Highly organised

**Table 2.4: Characteristics of high and low context cultures**

Based on these characteristics, countries with Western-style education (United States, Canada, Australia, United Kingdom, Germany, and most of Western Europe, including Scandinavia) can be described as having low context culture (Neuliep, 2003). High context culture in education is represented by countries such as Japan, China, Korea, the Middle East, France, the Mediterranean, Latin America and Vietnam. According to Johari et al. (2005), many students from high context cultures have difficulty using online courses prepared by low context culture countries such as the United States or Australia. Some reasons for this may be due to the limited ability in English, different learning styles and thinking patterns that often lead to misunderstandings in intercultural communication and in education. According to Edge, (2004, p.35) “English has become more than an optional lingua franca; it is now the required language of world empire for politic, military, and cultural”. Other studies (Dormann & Chisalita, 2002; Robbins & Stylianou, 2002) also explain cultural differences in website design through the works of Hofstede.

### **2.7.3 How Cultural Dimensions Affect Online Education**

As the Internet is used widely all over the world, in the context of this study of information seeking from the Internet in a school setting in two countries, Australia and Malaysia, the understanding of differing educational values and cultural dimensions needs to be considered. Wang and Reeves (2007) claim that since there is an increasing demand for online education via the Internet in various countries, online education providers such as the US, Australia, Canada, the United Kingdom and other countries should think about how they can accommodate students from different cultural backgrounds.

There is very limited literature on this matter and few online education studies have incorporated cultural perspectives. One study, by Joo (1999), has highlighted some cultural issues related to students using the Internet in classrooms mainly on the content of materials, the power of multimedia, writing styles, writing structures and web design. However, the study of these cultural issues has mainly focused on language differences between different cultures. In a more recent work, Bentley et al. (2005) investigated educational values and cultural expectations in more detail and found that learning styles should also be incorporated into language and technology within a cultural dimension with consideration of local and global perspectives. Bentley et al. (2005, p.119) identify eight educational values related to cultural issues relevant to Internet-based learning as follows:

- Language differential: language and culture are interrelated, and it is hard to understand one without knowing the other.
- Educational culture
- Technical infrastructure
- Primary audience (local or global perspectives),
- Learning styles
- Reasoning patterns

- Cultural context
- Social context

In their research, Bentley et al. (2005) incorporated recommendations made by other researchers to make suggestions for teachers to teach the learner how to learn (Hofstede, 1986). With regard to students, and designers, the content should be designed as culturally neutral as possible (Bentley et. al, 2005) for implementing culturally suitable online education.

On the other hand, Callahan (2005) examined cultural differences and similarities in the design of selected university websites using Hofstede's model of cultural dimensions. Graphical elements of a sample university homepage in a selected country were compared using content analysis. The results revealed that similarities and differences in website design such as language, colour and design interface can be identified through Hofstede's cultural model. Hofstede's model of culture consists of the following (Hofstede, 2001, p. 359):

1. Power distance – Power distance refers to the degree of acceptance of unequal distribution of power within society. High power distance is also known as the relationship between superiors and subordinates which is stricter than in lower power distance. In low power distance cultures, subordinates are free to express their opinions and are involved in managerial decision-making. High power distance is also demonstrated in the relationship between the older and younger generations, and between teachers and students. The younger generations and students are expected to respect and obey the older generations. Meanwhile, children in low power distance cultures are treated as equals.
2. Individualistic vs. collectivistic – An individualistic culture values personal achievement while a collectivistic culture emphasises the benefits of working in a group. People who live in the Western world tend to be more individualistic, while Asians tend to be more collective (Tayeb, 1996).

3. Masculinity vs. femininity – Cultures with high masculine values maintain traditional distinctions between genders, whereas feminine cultures dissolve gender differences.
4. Uncertainty avoidance – Uncertainty avoidance measures the degree to which people tend to stay away from uncertain situations. People in high uncertainty avoidance cultures prefer formal rules and regulations in order to reduce the amount of uncertainty, and are less inclined towards change than people in cultures with a low uncertainty avoidance index.
5. Long-term vs. short-term orientation – Long-term orientation refers to the fostering of virtues oriented towards future rewards and a short-term orientation refers to the fostering of virtues related to the past and present, in particular, respect for tradition, preservation of ‘face’ and fulfilling social obligations. According to Sondergaard, (2006) the main reason that Hofstede’s work has become influential is because his work has been supported by both qualitative and quantitative methods in different disciplines and at the same time has also been criticized by many other researchers.

### 2.7.4 Culture in Malaysia and Australia

In the United States, the educational goal within a multicultural society is to “reform the school and other educational institutions so that the students from various racial and ethnic groups will receive educational equality” (Banks, 1993). This can also be considered true in both Australia and Malaysia. This research will focus on the educational systems of Malaysia and Australia; however, multicultural education, and the origin of races and ethnic issues are not the primary focus of the research.

Both Australia and Malaysia are multicultural countries. However, the educational experiences in Australia and Malaysia differ. Malaysia follows norms practised by Eastern cultures and Australia is aligned with Western cultures. For more understanding about Malaysian and Australian cultures within the education

dimension, I have adopted two of Hofstede's Model of Culture facets which are relevant to this research in terms of a school's learning objectives. The key Australian and Malaysian values can be described as follows:

### **2.7.4.1 Power Distance**

With reference to Hofstede's model, Malaysia is considered a high power distance culture, which can also be called a respect culture (Hofstede, 2007). Culturally, students or young people are expected to respect their elders both in terms of speech and behaviour. As a result, students are expected to behave and be obedient to their teachers in any situation and context, including the classroom. In the classroom, teachers show their authority and dominance towards their students and emphasise their roles as information providers in the classroom. Asian students rarely question the teachers or instructions to avoid placing themselves in embarrassing situations and totally depending on teacher's idea and guidelines during their learning processes (Churton, 2003). Students are afraid, for example, that if their questions are not related to the subject matter, it will show a lack of intelligence.

### **2.7.4.2 Individualism vs Collectivism**

Western people tend to be more individualistic, while Asians are more collective (Tayeb, 1996). Collectivism refers to societies that are integrated into strong, cohesive in-groups, protecting each other and loyalty. (Hofstede, 2007). For Malaysians, the spirit of collectivism is more important than individualism. In the school and classroom environment these values are transferred from the teachers to their students. Malaysians work extremely well in a team environment and prioritise communal relationships such as the act of "gotong-royong" where community members unite and carry out various forms of service in order to create a harmonious society (Mansor & Ali, 1998; Hallinger, 1998). In contrast, Western cultures generally on individualism with USA and Australia as the most individualist (Hofstede, G. 2007), where the priority is placed more on the carrying out of individually-oriented tasks.

## **2.8 Summary**

This chapter provides background information about Australia and Malaysia emphasising the areas of geography, population, ethnicity, culture and the education sector. As this research is related to the education of primary school students, an overview of the education system in both countries is also provided. Particular attention is paid to primary schooling systems and the curriculum structure, with specific emphasis on ICT and Internet use. Both countries having similarities with the school children being from a wide variety of multicultural backgrounds. In both countries, the age of the students commencing schooling is 5 or 6 years old. In the Australian and Malaysian education systems there is emphasis on the literacy, numeracy and embedded the use of information and communication technology in the respective curriculums. However, a difference between these two countries is that the Australian system is not examination based compared to those in Malaysia. Education in Australia is different from that of Malaysia, in that the school systems vary between states and territories. After providing some background information on Australia and Malaysia, this chapter discusses the influence of culture on the education systems of both countries. In the following chapter, the literature on information-seeking processes is reviewed.



### 3 Literature Review

#### 3.1 Introduction

Interest in information seeking has encompassed the school context and, although much of the published research refers to secondary schools, some studies include children of primary school age (Hirsh, 1999; Moore & George, 1991; Moore, 2000; Wallis, 2005) and children in early childhood education (Spink & Heinstrom, 2011). A number of research projects have investigated information seeking related to particular resources such as the Internet (Bilal & Kirby, 2002; Broch, 2000; Bilal & Watson, 1998; Large et al., 2006) and libraries (Moore, 2000; Kuhlthau, 1996). As the Internet has become one of the most important sources of information in supporting primary children's learning environments, information seeking by children has become a key issue which requires more in-depth research. Studies have identified a number of challenges and problems with children's information-seeking strategies due, in part, to their inadequate levels of knowledge about how to use search engines, their limited level of research skills and the structure of the Web itself (Bilal, 2000, 2001, 2002). A recent study by Spink et al. (2010), of children in early childhood education, explored the Google search engine and found that children engage in complex Web searches, including keyword searching, query formulation, successive searches and relevance judgement.

This chapter discusses the literature on information seeking which includes information behaviour as a broader aspect of information seeking. As this research is focused on primary school children's information seeking, children's intellectual development and how they process the information is addressed. Models of information seeking related to the study and the development of the research conceptual model are also discussed. The chapter concludes with a discussion about information seeking by primary school children in school environments using the Internet.

### 3.2 Information Seeking – Definition and Concepts

This study investigates school children's information-seeking processes as the main context; however, it is also relevant to discuss the concept of information behaviour. This is a term sometimes used in preference to the terms information seeking, information use and information need. A few definitions of information behaviour cover information seeking. According to Choo et al. (1999), information behaviour can be divided into three sub-categories: information need, information seeking, and information use. They explain that the main reasons people need information are cognitive gaps, uncertainty and anxiety which will lead them to information seeking. They added that, for information seeking, the most important elements are information accessibility, psychological factors, and information quality. Wilson (2000, p. 49) has defined information behaviour that includes information seeking as follows:

Information behaviour is the totality of human behaviour in relation to sources and channels of information, including both active and passive information seeking, and information use. In the course of seeking, the individual may interact with manual information systems (such as a newspaper or a library), or with computer based systems (such as the World Wide Web).

Krikelas (1983, p. 6) defined information-seeking behaviour "as any activity of an individual that is undertaken to identify a message that satisfies a perceived need". Information seeking can be defined as the "purposive acquisition of information from selected information carriers" (Johnson, 2003, p.737). Meanwhile, Dervin (1998) defined the information-seeking process as "a complex, constructive process of sense making that is connected to the process of inquiring and learning". Marchionini (1995) stated that information seeking is related to learning and problem-solving. Like learning, information seeking requires the use of knowledge, but the difference is that learning demands retention while information seeking is used to complete a task (Peterson, 2008).

Ramirez et al. (2002, p. 217) defined interpersonal information seeking as “the pursuit of desired information about a target”. According to Vakkari (1999), information seeking is a process of searching, obtaining and using information for a purpose when a person does not have sufficient prior knowledge. Kuhlthau (2004) saw information seeking as a learning process. She claimed that people seek information to broaden their understanding of the world and information-seeking is a primary activity of life. Furthermore, Kuhlthau suggested that the systems designed to provide the information should be matched with the information in the process of learning. Kuhlthau’s model and ideas have been adopted in the present study, as I needed to know about primary school children’s information-seeking processes for academic purposes. Other researchers studying children’s and adolescents’ information-seeking has used Kuhlthau’s perspective (Branch, 2003; Bilal, 2000, 2001, 2002).

The study of information seeking has received a lot of interest from many disciplinary fields of study, such as health (Cline & Haynes, 200; Leydon et al., 2000), law, engineering, nursing (Hertzum & Pejtersen, 2000; Leckie, 1996), education (Hirsh, 1999; Limberg & Sundin, 2006; Weiler, 2005) and libraries (Taylor, 1967; Borgman et al., 2005; Kuhlthau, 2004; Greene et al., 2000) with many targeted users. The origins of the study of information seeking are in libraries and readership in general. The post-war period saw an increase in the amount of scientific literature and in 1948 the Royal Society Scientific Information Conference was the beginning of scientific concern for understanding how people used information in their daily life and work, especially information about science and technology. Ten years later, in 1958, the International Conference on Scientific Information was held in the US and included a significant number of studies devoted to the use of information systems and sources but not really looking at the human aspects of information use. However, one of the papers presented by Bernal (1958) at the conference stated that:

A knowledge of the requirements of the different users of scientific information and the uses to which they wish to put the information they secure should be the ultimate

determining factor in the designing of methods of storage and retrieval of scientific information.

Scientists became more concerned about the use of information as the main focus of their work before new applications of information storage and retrieval emerged. Before they started seeking information, scientists needed to understand the use of the information needed. In reality, people seek information in daily life but before they search for the information they should understand what information they need and whether it is applicable to solving their problems.

Previous studies have investigated the information seeking of professionals such as lawyers, doctors, and engineers (Case, 2012; Leckie, et al., 1996; Tilburt, 2007). Meanwhile in education, studies have tended to explore students and young learners in higher education rather than children. With regard to primary school children, very little research exists about their information-seeking processes, particularly in Australia and Malaysia. Therefore, I focused my research on investigating the information-seeking processes among primary school children in the school setting.

### **3.3 Information-Seeking Processes and Children**

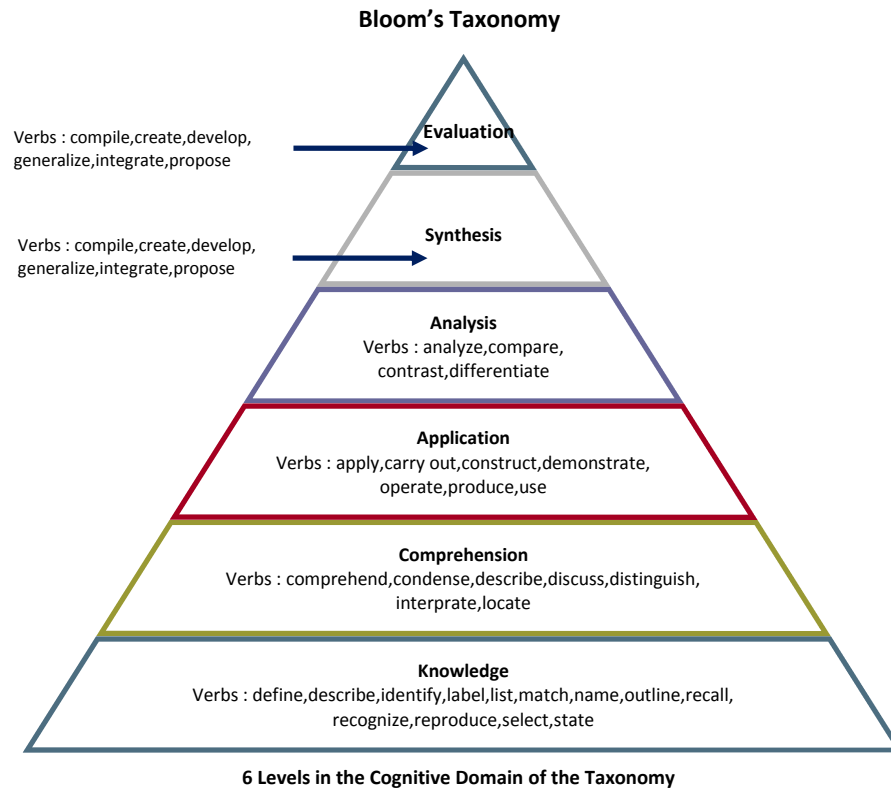
Most information retrieval systems have been designed for adult users, with little consideration of young information seekers (Choo et al., 1999; Eskola, 1999; Abels & Danuta, 2004; Shenton, 2004; Dresang, 2005; Chung & Neuman, 2006). Children are expected to use the same search engines as adults for seeking information from the Internet; however, their information needs, research approaches, cognitive abilities, skills and developmental levels differ from those of adults (Kuhlthau, 1991; Walter, 1994; Borgman et al., 1995; Hirsh, 1999; Xie, 2008; Piaget & Inhelder, 1969). Therefore, for this research, understanding children's intellectual development is important before investigating how they seek information from the Internet.

### **3.3.1 Children's Intellectual Development and Information Processing Theory**

Children are influenced by numerous variables during an information-seeking activity on the Internet, including subject familiarity and the use of Web search engines. An early study by Kuhlthau (1988) on the information-search process in libraries used cognitive theory and found that the searching was based on students' perceptions which led to expectation and were then directed to an action. In a more recent article, Kuhlthau (2004) claimed the literature of library and information science research provides cogent evidence that information-seeking is part of an intellectual process which progresses from problem awareness to understanding and meaning. The centrality of the cognitive aspect is referred to in the information processors' model, which shows that information processing is determined by prior experience and education (DeMey, 1977).

Fritscher (2011, para. 1) defined cognitive theory as "a learning theory of psychology that attempts to explain human behavior by understanding the thought processes. The assumption is that humans are logical beings that make the choices that make the most sense to them". In relation to the information-seeking processing, Fritscher added that this "is commonly used to describe the mental process in relation from the human mind to a computer". In relation to cognitive processes, Yousoof et al., (2007) stated that humans have limited working memory to process complex knowledge to long term memory, and that this will lead to cognitive overload for children. One way to reduce this cognitive process overload is through frequent practice with easy assignments and tasks (Clark & Taylor, 1994). These assignments may help to ease the transfer of information from working memory to long term memory. Frequency and repetition of familiar assignments and tasks allow children's' brains to focus on the unfamiliar information and will improve learning capacity. One example for representing cognitive domain is Bloom's Taxonomy. Bloom's Taxonomy (Bloom & Krathwohl, 1956) remains relevant today and is employed at all educational

levels, including schools and universities, to guide the teaching and learning process.



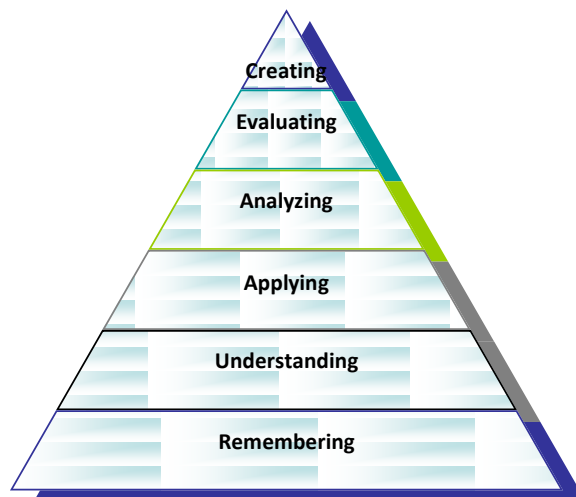
**Figure 3.1: Bloom's taxonomy by Bloom & Krathwohl, (1956)**

([http://ww2.odu.edu/educ/roverbau/Bloom/blooms\\_taxonomy.htm](http://ww2.odu.edu/educ/roverbau/Bloom/blooms_taxonomy.htm))

Bloom's Taxonomy presents six levels of thinking or cognitive domain: knowledge, comprehension, application, analysis, synthesis, and knowledge (Figure 3.1). Knowledge is the lowest level and is represented by memorising and being able to define and describe the information. In this stage, once the students get the task or assignment, the main priority is for them to understand and be able to identify what the problem is and what topic to search for using the Internet. The second level is comprehension, which involves students' ability to grasp meaning

and ability to use the information. The third level is application where it is required that the students apply and demonstrate information use in order to solve the problem. The fourth level, analysis, requires the ability to discuss the relationship between pieces of information. The fifth level is synthesis which involves arranging and organizing the information in order to produce the answers for problem solving. Evaluation is the highest level of cognition and relates to creating, developing and writing ideas.

In 2001, Anderson and Krathwohl presented new terminology for Bloom's Taxonomy: remembering, understanding, applying, analyzing, evaluating and creating. There are also six levels of cognitive domain, however, the categories are changed from noun to verb forms. Figure 3.2 is the new version of Bloom's Taxonomy. In the revised Bloom's Taxonomy, students should remember or recall the information that has been taught in the class and comprehend it. In order to test whether the student understands or not, the student should be able to explain the ideas and concepts, including applying the information in new ways.



**Figure 3.2: New version of Bloom's Taxonomy by Anderson & Krathwohl (2001)**

([http://ww2.odu.edu/educ/roverbau/Bloom/blooms\\_taxonomy.htm](http://ww2.odu.edu/educ/roverbau/Bloom/blooms_taxonomy.htm))

The pioneer of cognitive thinking was Piaget (1969), who proposed the theory of cognitive development for children. Piaget claimed that children think differently to adults. Piaget suggested that children's intellectual development is based on four stages of development: the sensorimotor stage (zero to two years), the pre-operational stage (two to six years), the concrete operational stage (seven to 11 years), and the formal operational stage (11 years and older).

For this research, the respondents were children aged nine to 11 years who fall into the concrete operational stage. I chose this age group of children because Piaget (1969) defined them as the group of children who first use mental operations in order to solve problems and who can think logically and manipulate information. According to Kail (2004, p. 185), "this mental operation makes thinking more systematic and powerful [and as a result] will give a logical flavour and consistent results". Building on Piaget's stages of children's intellectual development, information processing theory was considered in this research as another perspective on how children think and process information. This theory is used as another factor besides Piaget's stages of development to explain how and why children's information-seeking processes differ from adults. Information-processing theories describe how humans receive information and process it and how cognitive growth is produced as a result. The theories emphasise a continuous pattern of development, which differs from the view of Piaget who thought that development occurred in stages one at a time. Siegler (1998) agreed that it is better to focus on the information that children represent in information seeking rather than on the stages of development. Siegler explains that information-processing theories focus on "the information that the children represent, the processes that they apply to the information and the memory limits that constrain the amount of information they can represent and process" (Siegler, 1998, p. 64).

The focus of information-processing theories on the capability of children to process information is the most relevant aspect for this study, as McDevitt and Omrod (2004, p.186), the information-processing theories can be defined as "a group of theoretical frameworks that address how human beings receive, think



about, mentally modify, and remember the information, and how such cognitive processes change over the course of development”. They added that there are three components that hold information: the “sensory register”, the “working memory”, and the “long-term memory”. At first, information is received at the sensory register, and then it will be processed by the working memory. Later, it will be transferred to the long-term memory. However, Piaget’s claimed that learning is a stages process of meaning-making in children’s development. Information cannot simply be absorbed into a memory bank but the information must be explained in order to make sense of what they need to learn. Children need to be involved in their learning and it has to be real and meaningful to them. This will make their learning experiences more engaging.

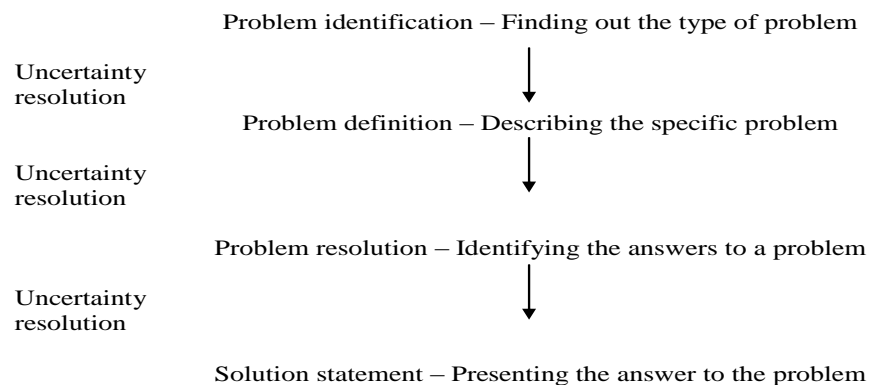
As children grow, the way they process information will change and develop. Theories explaining children’s intellectual development indicate that children at the age of ten to eleven are capable of performing intellectual activities. The implementation of new technology embedded in education curricula and classroom activities is encouraging children to perform more complex intellectual tasks. According to Ganly et al., (2009), children aged of six to ten are more able to focus on important information and are not as easily distracted as before. Ganly et al. (2009), claims that besides the age factor influencing how children process information, other factors including the environment and heredity profiles also can influence the processing of information and intelligence. According to Miller (2011, p. 290), “the knowledge gained, however is not obtained without interaction with the children’s external environment [and] cultural elements of attitudes and beliefs greatly influence how children process and recall information”. This view is consistent with Hofstede’s Model of Culture, as discussed in Chapter 2. Hofstede claimed that children’s development, and the way they think, has been transferred by their parents and other elders. Children will follow their adult role models and will grow up thinking that whatever their parents do is “normal”. Hofstede added that what is “normal” is a matter of value as the stable core of culture (see the discussion in Chapter 2, Section 2.7).

### 3.4 Models in Information-Seeking

This section reviews five information-seeking models that have been tested in previous studies. These are the Wilson problem-solving model, Ellis's model, Kuhlthau's, the Marchionini's, Johnson's models.

#### 3.4.1 Wilson's Model

The Wilson (1999) model is a major revision of Wilson's model of 1981 which explained a variety of information science factors but the basic focus is still on information needs. In Wilson's earlier study, he developed a model of information-seeking behaviour that is related to the individual's physiological, cognitive and effective needs. Wilson believed that people need information due to the demands of their work, life or environment. In Wilson's later work, he proposed a problem-solving model as shown in Figure 3.3.



**Figure 3.3: Problem-solving model of the information-seeking and searching process by Wilson (1999)**

(Wilson, T. D. (1999). Models in information behaviour research. *Journal of documentation*, 55(3), 249-270).

In Wilson's model, the stages of information seeking are: problem identification, problem definition, problem resolution and solution statement. People start seeking information to solve problems. The first thing people normally do is to

determine what kind of problem they have, and then move on to more detail about the nature of the problem. Their next step is to identify the answers to the problem by seeking as much information as possible to solve it. Finally, they find and present the answer to the problem. However, Wilson's model lacked a clear description on how people interact with information retrieval systems in order to seeking information and retrieve the information found.

### **3.4.2 The Ellis Model**

Ellis (1989) proposed a model to explain how users interact with information sources. Ellis investigated the information-seeking behaviour in social sciences, physical science and engineering and found that the set of characteristics he developed could be applied to these disciplines. He identified a list of characteristic actions of information-seeking behaviour as follows:

- Starting – activities characteristic of the initial search for information;
- Chaining – following chains of citations or other forms of referential connection between materials;
- Browsing – semi-directed searching in an area of potential interest;
- Differentiating – using differences between sources as filters on the nature and quality of the material examined;
- Monitoring – maintaining awareness of developments in a field through the monitoring of particular sources;
- Extracting – systematically working through a particular source to locate material of interest;
- Verifying – activities associated with checking the accuracy of information;
- Ending – activities characteristic of information seeking at the end of a topic or project, for example, during the preparation of papers for publication.

Ellis notes that the detail of the interaction in any individual information-seeking pattern will depend on the information-seeking activities of the person concerned at that particular time.

### **3.4.3 Kuhlthau's Model**

Kuhlthau's work (1993) works with Ellis's by adding stages of the information-search process that are related to feelings, thoughts and actions. Kuhlthau's initial study of secondary students associated a series of stages based on thoughts, feelings and actions in the process of completing an assignment. In Kuhlthau's model, she observed a relationship between information seeking and learning. She investigated high school students as they sought information for a school assignment, using journals, search logs, observation, conceptual maps, questionnaires and teachers' assessments. From the findings, Kuhlthau developed the information search processes (ISP) model that includes three main realms, namely, the cognitive, affective and physical domains. The ISP model consists of six stages that can be described as follows:

- Initiation – where a person has feelings of uncertainty and a need for information
- Selection – where a person has feelings of optimism and tries to identify a general topic in order to search for the information
- Exploration – where a person has feelings of confusion and tries to investigate or search for more information on the topic
- Formulation– where a person has feelings of clarity and will focus on a specific area within the topic
- Collection – where a person has feelings of confidence and gathers all the relevant information needed for the focal point of the information needed
- Presentation where a person has feelings of satisfaction or disappointment and completes the information search or task.

Figure 3.4 sets out Kuhlthau's ISP model showing in further detail the stages related to thoughts, feelings, actions and strategies.

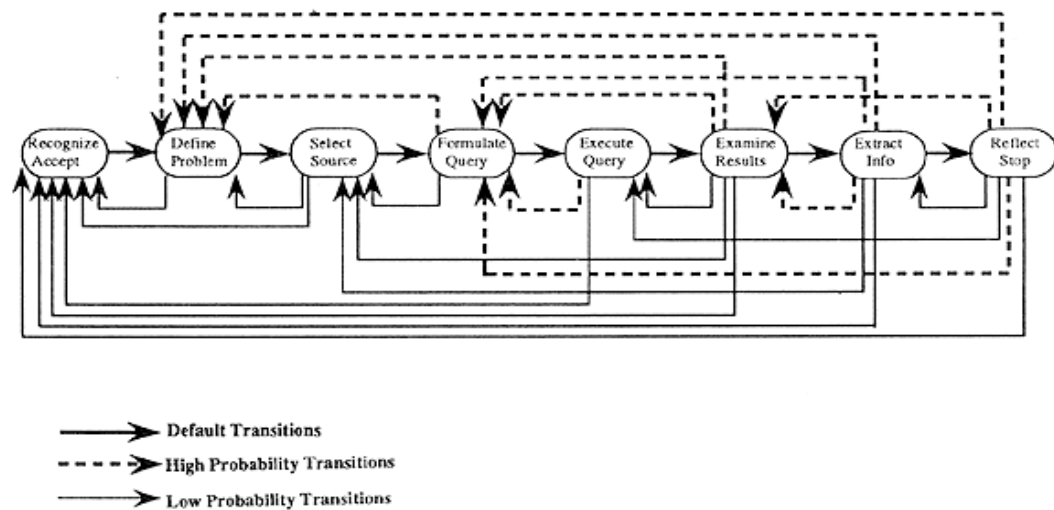
Tasks	Initiation	Selection	Exploration	Formulation	Collection	Presentation
<b>Feelings</b> (affective)	Uncertainty	Optimism	Confusion/ frustration/doubt	Clarity	Sense of direction/ confidence	Satisfaction or disappointment
<b>Thoughts</b> (cognitive)	vague → focused increased interest					
<b>Actions</b> (physical)	seeking relevant information , exploring → seeking pertinent information, documenting					

**Figure 3.4: Kuhlthau's information search process model (1993)**

([http://comminfo.rutgers.edu/~kuhlthau/information\\_search\\_process.htm](http://comminfo.rutgers.edu/~kuhlthau/information_search_process.htm))

### 3.4.4 Marchionini's Model

In the study by Marchionini (1989) students were from Grades 3-4 and aged from 9 years to 12 years use electronic resources in the research process and identified that information seeking depends on interactions among several factors such as information seeker, task, search systems, domain, setting and search outcomes. These involved systematic and opportunistic information-seeking processes. Marchionini (1989) found that students' searching behaviours are more towards a trial and error approach and he subsequently produced a model of problem solving in the Web environment. In his model the information-seeking process is composed of a set of sub-processes that begins with the recognition and acceptance of an information problem, followed by defining and understanding the problem, then choosing a search system, formulating a query, executing search, examining the results, extracting information, and finally the person will not stop until the problem is resolved or abandoned as in Figure 3.5 below. But again, these sub-processes may be too complex for children because the model involves formulating a query and examining the results.



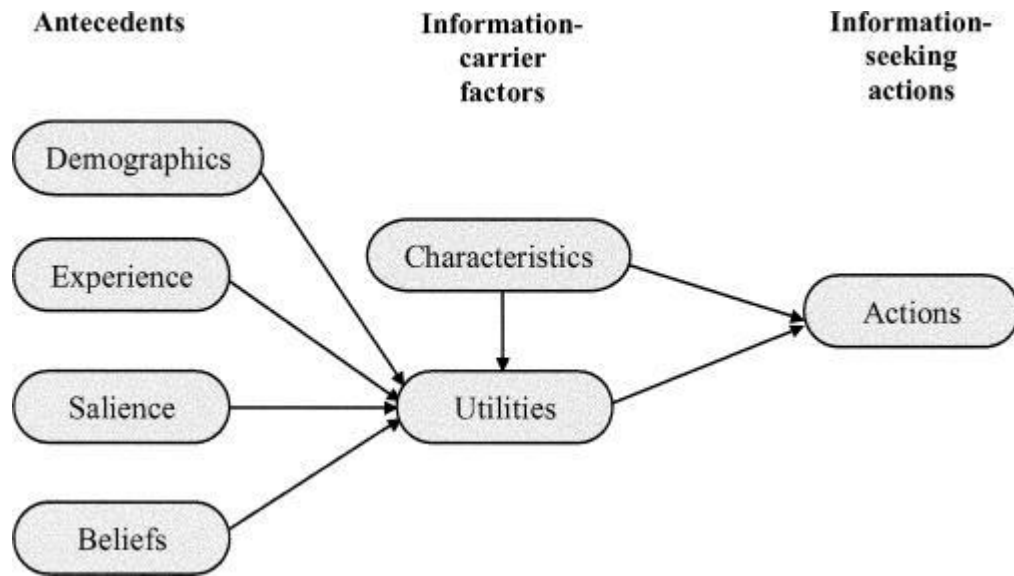
**Figure 3.5: The information-seeking process by Marchionini (1989)**

(Marchionini, G. Information Seeking in Electronic Environments, 1995)

### 3.4.5 Johnson's Comprehensive Model of Information Seeking

Johnson's (2003) research investigated how women diagnosed with breast cancer learnt about their condition he found that individual information seeking behaviour varied depending on what exactly the information need was: either information about breast cancer prevention, detection, treatment, causes, or dealing with emotional issues in handling the diseases. Johnson noted that an individual's choice of information source also varied depending on what type of information was required. Johnson identifies and validates:

- The relationship between motivation factors and an individual's personal need
- That information need influenced choices relating to information environment
- The relationship between information environment and individual information seeking behaviour.



**Figure 3.6: Johnson's Comprehensive Model of Information Seeking (1995, 2003)**

(Johnson, Donohue, Atkin, and Johnson, 1995)

<b>Model</b>	<b>Stages</b>	<b>Users</b>	<b>Perspectives</b>	<b>Children's perspectives</b>
Wilson (1999)	Problem identification Problem definition Problem resolution Solution statement	Professional users	Problem-solving with uncertainty and activities	Not appropriate for this study
Ellis (1989)	Starting Chaining Browsing Differentiating Monitoring Extracting Verifying Ending	Professional users	Information-seeking activities	Certainly relevant but involves children verifying or checking the accuracy of the information, which may not be possible or realistic
Kuhlthau (1993)	Initiation Selection Exploration, Formulation Collection Presentation	Library users	Cognitive, affective, physical behaviours	Relevant for this study
Marchonini (1995)	Problem recognition Problem understanding Choosing a search system Formulating a query Executing the search Examining the results Extracting information Reflecting	Users in electronic environment	Problem-solving	Too complex for children because it involves formulating a query and examining the results
Johnson (2003)	Motivation factors and personal needs Information need to information environment Information environment to information seeking behaviour	Health environment	Information seeking activities	Related but different fields of study

**Table 3.1: Summary of information-seeking models**



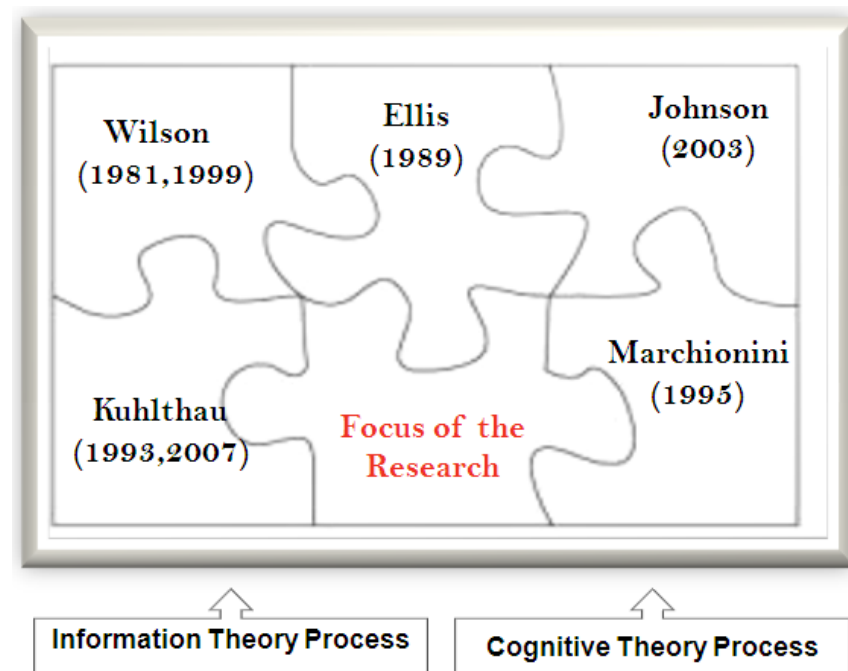
Each of the models explains the steps in the information-seeking process but from different perspectives. Wilson and Marchionini each proposed a model from the problem-solving perspective, meaning that problems are integrated into the process of information seeking. Wilson does not incorporate user interaction with an information retrieval system, while Marchionini's model is too complex for primary school children as it involves formulating a query and examining the results.

The strength of Ellis's model, as with Kuhlthau's, is that it is based on empirical research and has been tested in studies. Ellis's model suggests a list of activities that a user may follow in information-seeking; however, activities such as verifying or checking may not be relevant or realistic to children. Kuhlthau (1993) suggested that users are influenced by the affective (feelings), the cognitive (thoughts) and the physical (actions/strategies) in any information seeking. Although Kuhlthau's model is not integrated with information systems retrieval and the web environment, her model represents the tasks considered most relevant to the information-seeking processes undertaken by children for the present research.

Kuhlthau's research was conducted in a library and information services environment, and is also related to the learning processes of high school students. In more recent work, Kuhlthau, et al., (2008) found that the Information Search Process is still a valid model in the changing information environment, i.e. the digital age, for explaining students' information behaviour in tasks that required knowledge construction. The findings still support the three elements of feelings, thought and actions as suggested as in her model. Kuhlthau also added another element in order to suit the information search process in the digital age by combining constructive approaches which involves: acting and reflecting, feeling and formulated, predicting and choosing, also interpreting and creating to the learning process. She also includes strategies of collaborating, continuing, conversing, charting and composing. However, Kuhlthau (2008) claims that the most important aspect of seeking information in the twenty-first century is the

ability to use information for problem solving and she is not concerned with how technology is used for searching information.

Therefore, the focus of the current research integrates information behaviour, information need and information environment with the information-seeking process as shown below in Figure 3.7. Further explanation at section 3.5.1



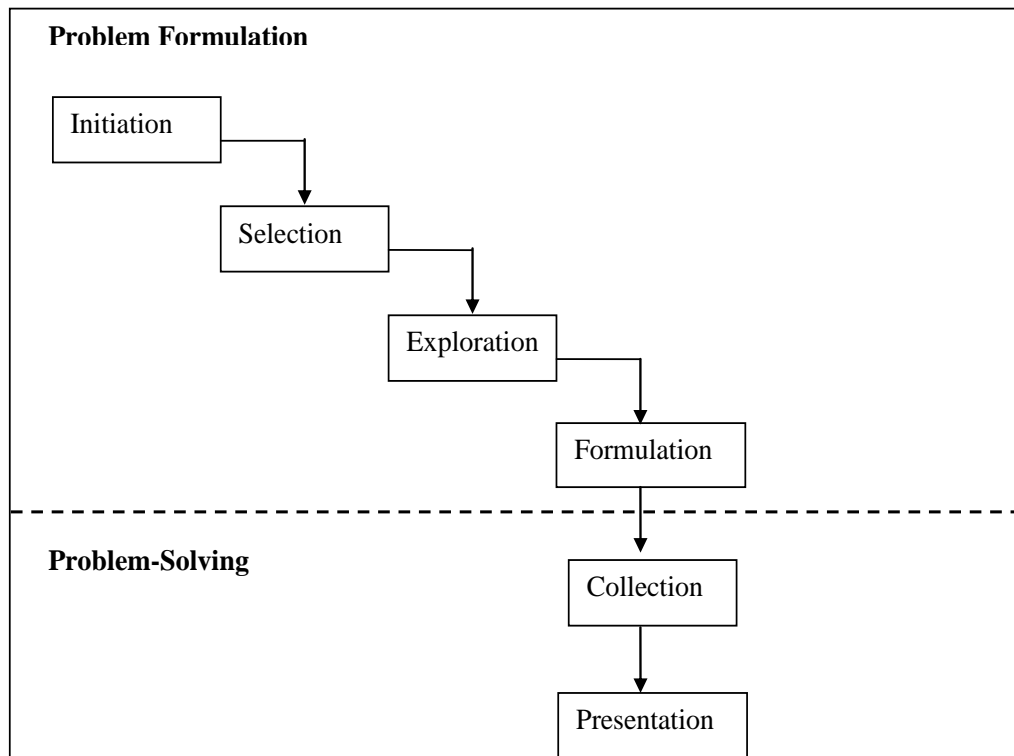
**Figure 3.7: Model and theory underpinning the research**

### 3.5 Conceptual Framework

The conceptual framework in this research was developed and generated by the review of the literature in order to identify the information-seeking processes undertaken by primary school children using the Internet for academic purposes. The information search process model that has been adapted in this research is Kuhlthau's ISP model (1993). It was selected based on its relevance to and suitability for this research. As such, the stages of the model are described here in more detail.

In Kuhlthau's model (1993), she observes a relationship between information seeking and learning. She identifies the stages of ISP related to affective feelings, cognitive thoughts and physical actions in the learning process. This model was adapted to guide the shaping of the methodology and instruments for the present research. Kuhlthau's model was used in order to identify the information-seeking processes taken by school children using the Internet for their academic purposes and, in particular, to address the first research question, "What are the processes undertaken by school children when searching for information for academic purposes from the Internet?".

Figure 3.8 shows Kuhlthau's model adapted in the present study, which is divided into problem formulation and problem solving activities. The study also adapts the six stages of Kuhlthau's model, as summarised in Table 3.2.



**Figure 3.8: Information-seeking process based on Kuhlthau's model (1993)**

Phase	Description	Actions
Initiation	Awareness of lack of knowledge and understanding Attempt to understand task and relate it to prior knowledge	Recognise
Selection	Identification and selection of topic to be investigated	Identify
Exploration	Investigation of information on general topic	Investigate
Formulation	Formation of focussed perspective on the topic Development of ability to identify relevant information	Formulate
Collection	Specification of need for relevant, focussed information	Gather
Presentation	Completion of search and usage of results	Complete

**Table 3.2: Description of phases based on Kuhlthau's model (1993)**

Based on Kuhlthau's ISP model, observations were carried out in this study to identify how the primary school children went through the problem formulation

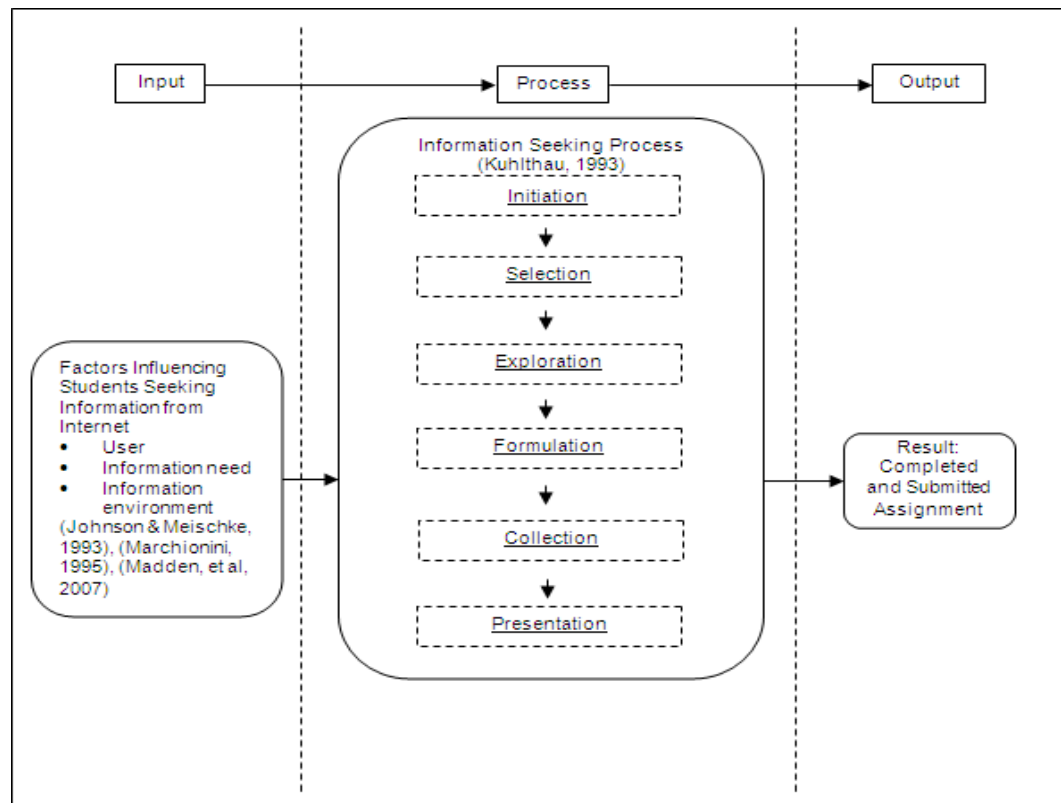
stage, which started with the initiation or recognition of an information need derived from the task given by the teacher. Then, observations were carried out to identify the information channels the children used when finding information on the Internet and later how they searched for information in order to solve the given task, such as formulation, queries used, evaluation of the search results or re-iteration of searches if necessary.

The next step, after the problem formulation, is problem-solving. This involves specification of the information gathered that the primary school children thought would give the best answer or would solve the task given. At the final stage, once they completed the task, they presented the answers or results.

### **3.5.1 Conceptual Framework Development**

This section discusses the conceptual framework development for this research. According to Vakkari and Jarvelin (2005), knowledge in a research study can be developed by larger empirical support, by introducing new concepts or refining old ones, or by introducing new relations between concepts in a theory. In this research design, the interaction of variables was derived from the literature, and then reconceptualised to make an original contribution to knowledge and, in addition by exploring the relationships between the concepts in Kuhlthau ISP model.

Figure 3.9 shows the enhancement of the ISP from the primary school children's perspectives for locating information from the Internet academic purposes.



**Figure 3.9: Conceptual framework**

The elements of the conceptual framework are described in Table 3.3. As the input elements users refer to the primary school children for both countries aged between 10 and 12 years old. The main objective of the research is to identify how primary school children seek information from the Internet for academic purposes. Therefore, for the information environment, it is relevant to their Internet usage and the information needed by primary school children to complete their research tasks and assignments in school settings. The concepts of culture assist to explain the different environments of Malaysia and Australia and their respective perspectives. The information-seeking processes investigated are based on Kuhlthau's model of ISP (1993), and supported by children's intellectual development theory. Meanwhile the output element of the research design is the information found by primary school children.

Elements in the framework	Description
<b>Input</b>	
Users (Children/Students)	Children are expected to use the same search engines as adults for seeking information from the Internet. However, their information needs, research approaches, cognitive abilities, skills and developmental levels differ from those of adults (Kuhlthau, 1991; Walter, 1994; Borgman et al., 1995; Hirsh, 1999; Xie, 2008; Piaget & Inhelder, 1969).
Information environment (Internet usage)	As the Internet has become one of the most important sources of information in supporting their learning environments, children's information seeking has become an emerging issue. Many studies have identified a number of challenges and problems with children's information-seeking strategies due to their inadequate knowledge of how to use search engines, their limited level of research skills and the poor structure of the Web itself (Bilal, 2000, 2001, 2002).
Information need (Task/Assignment)	<p>The use of the Internet has fostered changes in students' learning styles, especially in the steps taken to complete an assignment given by teachers. Since the Internet has become embedded in their curriculum, students need to have competence in using search engines and in digital knowledge production (Van, 2010). Students have self-confidence in searching the Internet for personal use, but insecurities when using it for academic purposes (Watson, 2001).</p> <p>According to Schacter, Chung, and Dorr (1998), based on their findings related to fifth and sixth grade students, the searching performance of these young children indicated that children had more successful searches on ill-defined tasks compared to well-defined tasks.</p>

Elements in the framework	Description
<b>Input</b>	
Environment (Culture)	According to Ganly (2007), the factors influencing how children process information include the environment. As Miller (2011:290) stated: “the knowledge gained, however is not obtained without interaction with the children’s external environment [and] cultural elements of attitudes and beliefs greatly influence how children process and recall information”.
<b>Process</b>	
Information-seeking processes based on Kuhlthau’s model	The present study focuses on Kuhlthau’s model (1993) with information-seeking processes for primary school children understood in six stages: initiation, selection, exploration, formulation, collection, and presentation.
Piaget’s intellectual development	Piaget claimed that children’s intellectual development differs based on age in four stages of development: the sensorimotor stage (zero to two years), the preoperational stage (two to six years), the concrete operational stage (seven to 11 years), and the formal operational stage (11 years and older).
Information processing theory (2004)	According to McDevitt and Omrod (2004:186), the information processing theory can be defined as “a group of theoretical frameworks that address how human beings receive, think about, mentally modify, and remember the information, and on how such cognitive processes change over the development”. They added that there are three components that hold information: the sensory register, the working memory, and the long-term memory.
Bloom’s taxonomy (1956)	Bloom’s Taxonomy presents six levels of thinking or cognitive domain: knowledge, comprehension, application, analysis, synthesis, and evaluation.



Elements in the framework	Description
<b>Input</b>	
<b>Output</b>	
Information found by the children/students Submission of completed assignment	Young adults believe in the virtual world as much as their real world as they are allowed to do anything on the Internet, and do not even think that cutting and pasting is plagiarism (McCarron, 2004).

**Table 3.3: Elements in the conceptual framework**

### 3.6 Internet Use by Primary School Children

The Internet has become an important tool in people's everyday lives. People are motivated to use the Internet because of their specific purposes (Susskind et al., 2003). Individuals are willing to engage in online information seeking due to the richness of the available information (Papacharissi & Rubin, 2000; Swaminathan et al., 1999; Ramirez et al., 2002). At the same time however, studies have found issues in using the Internet for information searching such as environmental instability, user competence, security, trust, and privacy (Swaminathan et al., 1999; Miyazaki & Fernandez, 2001; Rifon et al., 2005), especially for children. Eastin and LaRose (2000) claim Internet self-efficacy to be positively related to Internet use and negatively related to anxiety or stress surrounding Internet use. According to Li et al. (2007), the Internet may or may not present accurate information to users. As we are aware, the Internet can be accessible to anyone including children. Children are often unaware of the nature of the information available on the Internet and tend to trust it in the way they trust information available in books (Wilson, 1997). Credibility of information available was questioned as it is generally easy to create and be modified by the public (Kotler et al., 1997).

Valcke and Rots (2010) in their study determined some descriptors for young generations using the Internet such as: "digital natives", "the net generation", "screenagers", "whiz kids", and also "risk kids". Research in developed countries

show that primary school children use the Internet mainly at home: 91.2% compared to 66% use at school (Lee & Chae, 2007; Mumtaz, 2001). Schools now have technology embedded into the curriculum for teaching and learning purposes. Large (2002) stated that a growing amount of information directly intended to support elementary school students in their class assignments and learning processes is available on the Internet. Primary school children seek information for personal use and also for academic purposes. The Internet has become the most popular information resource and it is increasingly used compared to printed resources (Kuiper et al., 2008). Primary school children use it extensively both at home and at school. Hutchison et al. (2007) stated that elementary school children (aged 6-11) were among the largest group who used computers and the Internet. McCarron (2004) stated that young adults believe in the virtual world as much as their real world as they are allowed to do anything on the Internet. According to Spruell (2002, p. 26) “students are just being thrown into the waters of the Information Superhighway and told to swim”. The increased use of the Internet in schools has fostered the need for effective information-seeking processes for primary school children as the amount of information available is too voluminous for them.

School children are introduced to various types of information in school settings, such as information from printed material and non-printed material, in order to complete and solve problems in their homework, class projects, and for examination purposes. However, they often have difficulty in locating information from the Internet for academic purposes (Watson, 2001). Since the Internet has dramatically changed the information environment, and all of the primary schools in the present study make use of it, the focus of interest in the study was to determine the processes undertaken by the primary school children in seeking information from the Internet for academic purposes.

The existing research into children’s information-seeking processes is associated with the use of various type of electronic resources such as online databases (Marchionini, 1989; Edyburn, 1998), library catalogues (Solomon, 1993), CD-ROMs (Taylor, 1992), and Internet (Bilal, 2000, 2001, 2002; Madden, 2006). The

Internet is used by primary school children for reasons such as communication, chatting, games, and seeking information. Livingstone and Sonia, (2003) identified that children use the Internet for three main reasons: entertainment, education and edutainment and they choose to search for information related to school assignments using the Internet more often compared to using other resources provided in school (Gunn & Hepburn, 2003). However many students find it difficult to locate useful information due to lack of critical and analytical skills despite being confident with social networks and computer devices (Ashling, 2008). They seem to have computer competencies but not information seeking competencies from the Internet. Previous studies have found that children lacked skills to formulate search terms, keywords and understand Boolean search logic (Fidel et al., 1999; Marchionini, 1989). Nasset (2009) investigated young children's behaviours when searching for information in both electronic and non-electronic resources and found that students using electronic resources had issues in planning searches and determining the right keywords.

Another important issue that has been highlighted by previous research is the difficulty children have when selecting a result from a search result list appearing on the site interface (Jochmann-Mannak et al., 2010). Foss et al., (2012) studied children from urban areas in the United States aged between 7 and 11 years old and reported that the most frequent selection criteria by these children was the summary or a snippet provided by Google. Providing a summary will give more opportunity for the children to understand what they have located and they are more likely to use a summary as a reason to select a particular search result from a list of similar results.

Reading on the Internet requires different skills and understanding of information (Coiro & Dobler, 2007; Allington, 2001; Leu et al., 2007). According to Coiro (2003), reading comprehension skill is an important strategy that may require locating, evaluating and synthesizing information on the Internet (Leu et al., 2004) and if students cannot cope with this, they will be left behind (Leu, 1997). The Internet offers a voluminous amount of information from the text or links to follow, and as an Internet reader they should be critical, be able to synthesize the

information found and should make useful decisions regarding which sites to choose and follow. Students who have less skill will often end up frustrated at an unrelated site. This is in comparison with traditional reading, where teachers commonly direct students what to read and which page to refer to in text books etc.

### **3.7 Children's Knowledge, Literacy and Research Skills in Using the Internet**

As the Internet has become one of the most important sources of information in supporting their learning environments, children's information seeking has become an emerging issue. Studies have identified a number of challenges and problems with children's information-seeking strategies due to their inadequate knowledge of how to use search engines, their limited level of research skills and the poor structure of the Web itself (Bilal, 2000, 2001, 2002).

Studies have found that children experience difficulties in retrieving information from electronic information sources (Large, Beheshti & Rahman, 2002). As children use the Internet as the major source of information for their school projects and entertainment (Rothman, 2003; Madden et al., 2007), there is a need to learn about children's information-seeking processes. Large and Beheshti (2000) suggested that although the Web can make an important contribution to information retrieval for school children, it requires a more straightforward interface and, more specifically, it should be aimed towards them. This is supported by Bilal's (2005) finding that children preferred a portal with information structural designs that offered directness, displays of retrieved information with information summaries and spell-checking tools.

Most information-seeking studies related to the education field have found that children's information-seeking and retrieval skills differ from adults, and seeking information from the Internet creates difficulties for children (Agosto & Hughes-Hassell, 2005; Bilal, 2001; Hirsh, 1999; Large, 2004). Kuhlthau, (1993) mentions

that serious problems will be encountered in the process of learning if the system designed does not match the desired way of providing information to children and many interfaces do not consider children's skills and preferences (Hutchison et al., 2007). Furthermore, studies have found that many websites do not consider the information processing and motor skills of children, children's searching and browsing skills, how children prefer to find things, and also the children's ability to select content in reading material. Broch (2000), for example, found that children often have difficulties such as spelling and reading and lack navigational skills in searching for information from the Web. The increase in access and usage of the Internet in schools requires children to not only have navigational skills, but also research skills. Locating information from the Internet may seem easy to primary school children, however finding relevant information poses difficulties for them (Halavais, 2009).

Children's skills in seeking information need to be developed in the early stages of the learning process in order to build their research skills. This is because teachers expect children to locate information from a variety of information sources, organise the information found, evaluate it and compile it, when preparing documentation for their school assignments or projects. According to Hess (1999), learning by using electronic modes needs special attention in regard to information searching skills, Internet browsing skills and evaluation skills for students. Primary school children need to be able to effectively evaluate or filter relevant information with critical thinking; this requires spelling and reading skills in electronic environments such as the Internet. Coiro and Dobler (2007) explored the online reading comprehension strategies of students in Grade 6, mainly to characterise the reading process while students searched for information from the Internet. Information and literacy skills are important to student in order to be able to handle information and to solve the problems via Internet environments. (Katz, 2013). Katz, (2013) suggests that due to the information technologies advancement and Internet use among the students, the importance of ICT literacy and information literacy experts should be highlighted.

Since children have emotional skills and needs that vary from those of adults (Walter, 1994; Bjorklund, 2000; Bilal & Kirby, 2002; Druin, 2005), they need to possess not only adequate information-seeking skills but also intelligent affective strategies that will help them cope with complexity. According to Barrett, (2012) one of the main factors influencing an Internet search by young children is their domain knowledge. This is consistent with the finding by Wildemuth (2004) that students with less knowledge of the topic show less efficiency in their search process.

Domain knowledge was shown to affect search behaviours, and understanding and familiarity with the topic may also play a role in search success. Students who understand the information found on the sites may move forward by following the related or relevant links that appear in the search results. Students may feel interested and excited if they are familiar with the subject matter; for example, when they are seeking information for their non-academic or personal information. They look forward to searching for information about something related to their interests, have self-confidence in searching on the Internet for personal use on topics with which they are familiar, but have insecurities during use of the Internet for academic purposes (Watson, 2001). Unfamiliarity with the topic and the structure of the Web increase the difficulty of the search process (Coiro & Dobler, 2007)

### **3.8 Tasks and Learning Processes**

There is a significant amount of research aimed at how secondary students or adolescents use electronic resources and what factors influence their searching behaviour related to learning processes (Kuhlthau, 1993; Fidel et al., 1999; Wilson, 1997; Hess, 1999). Most researchers have investigated search behaviours using electronic resources in order to interpret patterns in the learning process. However, there is limited research into the information-seeking behaviours of children using the Internet (Schacter, Chung & Dorr, 1998; Hirsh, 1999; Bilal, 2000; Madden, 2006). Studies found that, children's information-seeking behavior

was influenced by what type of task given to them. According to Schacter, Chung and Dorr (1998), children have difficulty finding relevant information on the Internet. They found in their performance results that children did searches more effectively on ill-defined tasks than on well-defined tasks. This shows that children searched successfully for tasks that involve general questions compared to tasks that involved specific questions (Bystrom & Jarvelin, 1995). Ill-defined tasks or poorly structured problems are defined as having vague goals (Voss & Post, 1988) that allow multiple solutions or answers (Kitchner, 1983). In contrast, well-defined tasks or well-structured problems have a single solution and structured goals (Sinnott, 1989). As the research explains (Voss & Post, 1988), students can easily browse the Internet for the answers to specific questions but for ill-defined tasks the Internet will provide more potential answers for consideration. For this research, it used both types of task: ill-defined task and well-defined task to investigate primary school children's information-seeking processes from the Internet.

In relation to the learning process, subject or task familiarity may lead to a successful search (Wildemuth, 2004; Lazonder et al., 2000). This shows that when children search for information on a topic that they are familiar with the process of seeking information is more interesting and may give better results. Enochsson (2005) found that young students (aged 6-11) take more time to seek information on the Internet compared to older students (aged 13-17) due to the stress on basic language skills, basic computer skills and their critical thinking. Bilal and Kirby (2002) found the major factors that contributed to the differences in information seeking between children and graduate students were the ability to recover from breakdowns, navigational style and focus on task.

The information retrieval systems designed for adults do not necessarily fulfil the needs of children. Primary school children have problems completing assignment search tasks given by teachers (Bilal, 2000), such as making typing and spelling errors (Druin et al., 2009) and issues with keyword searches and formulation of queries (Bilal, 2002; Large et al., 1998). Other issues such as difficulties in the selection of relevant information from the search results and reading

comprehension are common (Jochmann-Mannak et al., 2010). Large et al. (2007) explain that children use Web portals differently from adults; therefore, it would be better to design portals that are compatible with their developmental needs and personal interests in order to make information resources on the Web accessible to them. At the same time they recommend consideration of the type of task given by the teachers (ill or well-defined task), familiarity with the task and age factors that may influence the success of children's information seeking on the Internet.

### **3.9 Teachers' and Teacher Librarian Guidance**

Large and Beheshti (2002) suggest that the web is too complex for children in primary school, but given proper instruction, some initial training from teachers or teacher-librarians and well-designed technological tools it can be a very useful resource which allows them to grow and co-operate in the information age. In school settings in particular, teachers and teacher-librarians manage and guide students to appropriate print and non-print resources. Madden et al. (2006) found the factors that most determined children's ability to search successfully are the amount of experience using the Internet, the amount of guidance, ability to explore the virtual environment and to use the tools accordingly.

Gunn and Hepburn (2003) found that students frequently learn how to do school assignments through trial and error. Furthermore, students rely on friends and classmates who often teach them how to locate information on the Internet in different ways compared with those demonstrated by teachers or teacher-librarians. Therefore the school management needs to provide appropriate information retrieval systems that will suit the requirements of students at their respective ages and level of academic ability. Bilal and Kirby (2002) suggest school curricula include use of the Web for class related assignments, with school librarians and teachers needing to provide effective Web training programs.

According to Zain et al. (2004) the key challenge of transformation in the use of technology is the teacher's need to change their teaching pedagogy from



knowledge instruction to knowledge construction. Teachers and teacher-librarians need to reflect on the information seeking of children in schools and whether the present teaching of information skills can enable children to cope with the current digital information. At the same time, they should also encourage children to take a critical approach when finding and evaluating information.

Enochsson (2005) says that seeking information is a complex process which demands knowledge and skills from various areas; teachers have to be attentive to all different skills and that skills need to be included in training session. Teachers and teacher-librarians should have competencies in information skills, technology and network/ICT literacy. Berkowitz (2002) reports that information and technology skills are the 'new basics' and being able to find and use information more effectively is essential to the success of students of all ages. Network literacy is defined as the ability to identify, access, and use electronic information and includes knowledge of the range, organization, and uses of networked resources.

In order to create an information literate person, teacher librarians should be aware of the importance of the value of information gained (such as resource selection, database searching, and database searching techniques), information evaluation (especially information retrieved from the Internet), information usage, electronic citation styles, and techniques for analytical thinking (Kamal & Othman, 2012). The role of teachers should change from instructors to mentors, and teacher librarians, as information professionals, should be responsible for developing students' information literacy by coordinating with classroom teachers. Other important roles of teachers and teacher-librarians are:

- Teaching and learning: co-ordinate teaching and learning activities such as an information literacy program
- Leadership: should have professional growth and development by attending the courses, workshop for training.
- Curriculum involvement: to support resource based learning and provide up-to-date and accessible resources

- Management: to provide efficient procedures and systems for delivery of services
- ICT development: to use technology as a tool to facilitate the learning process.

According to Raja Abdullah and Saidina Omar (2003), in order to fit the student with the information literacy programme in the new knowledge society, a well-trained teacher-librarian should have competencies as follows:

- Finding information located in information sources
- Using ICT for information retrieval & communication
- Executing a process that involves information use and info technology
- Controlling information
- Building up a personal knowledge base in a new area of interest.

However, as mentioned earlier it is not only the duties of teacher-librarian in providing information-seeking strategies on the Internet to school children. Teacher-librarian can help classroom teacher in providing resources information, such as the Internet site that is required for a lesson that suitable for the school children. The advantages of having these teachers as school librarians is that, they are mostly trained teachers who are familiar with the school curriculum. Mckenzie (2002) states that through this cooperative management with classroom teachers, teacher-librarians can explain and demonstrate what resource based learning is, educating and guiding teachers into experimenting, implementing and accepting it as part of the curriculum and their teaching repertoire. Kuhlthau's et al. (2008) suggests that it is useful to apply the concept of invention with the students especially for inquiry projects. The intervention by teachers and librarians can assist in guiding the students with the learning processes at each stage in the information-seeking process. In Kuhlthau's model, she introduced the concept of zone of intervention, however for this research I have not included it as my research was based on one-to-one observation.

### **3.10 Information-Seeking and Culture**

There is limited study on the impact of culture on information-seeking processes. However, findings include that there is a significant cultural difference in information seeking behaviour. Milewski and O’Sullivan (2007) found that engineers from “collectivist” cultures and “individualist” cultures had different preferences in seeking types of information. Komlodi and Carlin (2004) made four key findings related to cultural differences: culture impacts on the individual’s ability to process information; the amount of information conveyed has a strong impact on information seeking behaviour; power and status have an impact; and individuals from a culture with a more linear view of time are more likely to focus on one search activity at a time than multi-task.

In the context of my research, cultural differences may be present since the study involves two different countries as discussed in Chapter 2.

### **3.11 Summary**

A literature review of children's information-seeking processes was the main focus of this chapter, which highlighted some important factors that influence students' behaviour when it comes to seeking information from the Internet or web environment. The chapter discusses the models and theories underpinning the research focus and reviews literature related to studies such as information-seeking using the Internet by primary school children, children's knowledge and research skills, the learning process and the need for teacher and teacher librarian guidance to monitor students' seeking behaviour and process.

This thesis now moves into the next chapter to discuss the research methodology and approach used in order to answer the research questions.

## **4 Research Methods and Approach**

### **4.1 Introduction**

This study uses descriptive and case study approaches to identify school children's information-seeking processes using the Internet for academic purposes. Neuman (2006, p. 33) defines exploratory research as "research in which the primary purpose is to examine a little understood issue or phenomenon to develop preliminary ideas and move toward refined research questions by focusing on the 'what' question." According to Neuman (2006) the main reason for using descriptive research is to "paint a picture" using words or numbers to present a profile, which may include a graph or tables to illustrate the narrative. This research uses a mixed methods approach to identify and describe the processes undertaken by primary school children when searching for information using the Internet for academic purposes. In mixed methods research, the methods share the same research questions with the aim to collect complementary data and to conduct equivalent analysis (Yin, 2011). The advantages of using mixed methods is that it allows me to address more complex research questions and collect a richer and stronger base of evidence than can be accomplished by any single method. The current research focuses on two main questions:

1. What are the processes undertaken by school children when searching for information for academic purposes from the Internet?
2. What are the success factors and challenges that primary school children face when searching for information from the Internet for academic purposes?

This chapter discusses and describes the research methodology and approaches adopted in this study. The discussion begins with the rationale for the choice of a mixed methods approach, followed by an overview of the data collection techniques, procedures, data analysis, validity and reliability as well as ethics

processes and clearance, all of which were carried out in order to address the research objectives. The quantitative and qualitative inquiry has been explained in detail in the section on data collection.

## **4.2 Mixed Methods Approach**

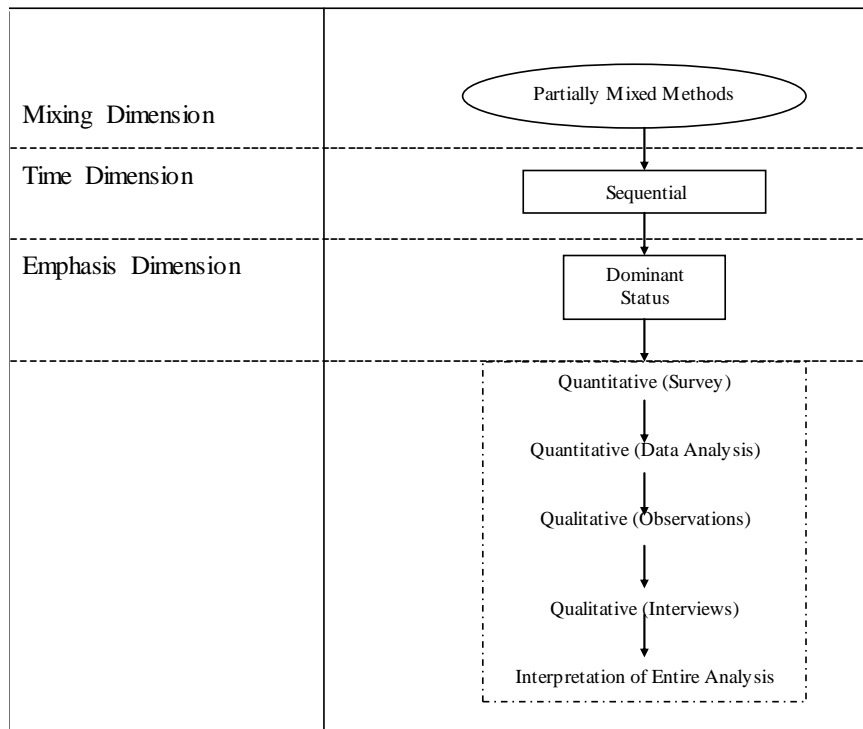
According to Silverman (2009, p. 10) and Punch (1994, p. 244), the choice of method for the research should not be predetermined as it is based on how to identify appropriate answers to the research questions. Other scholars, such as Creswell (2008) and Descombe (2003), agree that, in conducting research, the best methodology should be appropriate for the types of problems under investigation or should depend on the purpose of the research. Based on the nature of the research questions posed in this study, a mixed methods approach was used to gather both qualitative and quantitative data; using two methods can best address the overall research objective, with a second method to support a primary method (Creswell and Clark, 2011). I used the quantitative approach to acquire a broad overview of the phenomena by gathering data about the background of primary school children, and their usage, knowledge, and challenges of using the Internet for academic purposes. In the second phase, the approach focused on observation to gain more detailed information such as how school children seek information from the Internet. Finally, qualitative data were obtained through interviews to ascertain the views from teachers on how primary school children seek information.

Scholars have defined mixed methods research in different ways but all of them have emphasised that mixed methods research combines quantitative and qualitative methods in the research. Saunders et al. (2007) defined mixed methods research as research that “uses quantitative and qualitative data collection techniques and analysis procedures either at the same time (parallel) or one after another (sequential) but does not combine them”. Creswell and Clark (2007, p. 5) described it as follows:

Mixed methods research is a research design with philosophical assumptions as well as methods of inquiry. As a methodology, it involves philosophical assumptions that guide the direction of the collection and analysis and the mixture of qualitative and quantitative approaches in many phases of the research process. As a method, it focuses on collecting, analysing and mixing both quantitative and qualitative data in a single study or series of studies. Its central premise is that the use of quantitative and qualitative approaches, in combination, provides a better understanding of research problems than either approach alone.

My research was based on Creswell and Clark's (2007) definition of mixed methods and at the same time employed the partially mixed sequential dominant status approach based on Leech (2009). According to Leech, this approach represents three dimensions of methods:

1. The mixing dimension involves conducting a study with two or more phases that occur sequentially. In the first phase of this study, school children from both Malaysia and Australia answered a set of questionnaires that included demographic information. The next phase involved observations of the school children in order to identify the processes undertaken by these children in seeking information using the Internet for academic purposes. The third stage involved interviews with school teachers. The quantitative and qualitative data were collected and analysed separately, and mixing took place at the data interpretation stage.
2. Time orientation refers to when pieces of data are collected one after another, stage-by-stage, beginning with survey questionnaires (quantitative), followed by observation and interviews (qualitative).
3. In the dominant phase, there is an emphasis on qualitative research approaches. According to Meriam (1998), qualitative analysis helps to uncover and understand a phenomenon about which little is known.



**Figure 4.1: Typology of mixed research and mixed methods**

(Adapted from Leech, 2009)

As illustrated in Figure 4.1, the study begins with quantitative data collection (a broad survey) in order to allow generalisation of the results to a population, such as to identify the usage, knowledge and challenges of using the Internet in school settings. It then focuses, in the second phase, on qualitative data collection, that is, observations and concludes with interviews, carried out with the teachers to consider how primary school children seek information in the school setting.

Chappell (2004) explains that a quantitative research approach is a useful way to measure attitudes, behaviours, preferences or beliefs by using statistical analysis that generates or uses numerical data. Qualitative research can be combined with quantitative research to get a richer picture and therefore gain better understanding. Both approaches can be used in order to strengthen the overall study and to enhance understanding of the research problems (Creswell & Clark, 2007).



Scholars such as Creswell and Clark (2011) have outlined the advantages of using the mixed methods approach:

1. Mixed methods research brings the weaknesses of both qualitative and quantitative methods; however, the strengths of one method makes up for the weaknesses of the other method.
2. Mixed methods research provides more evidence for research problems and the researchers have more flexibility to employ various data collection methods. I can use more than one type of data collection as a tool to investigate my research.
3. Mixed methods research encourages the use of multiple worldviews rather than being focused on a single paradigm that only can be associated with quantitative research or qualitative research.
4. Mixed methods research is practical as the researcher is free to use all methods to solve problems and answer the research questions by using both words and numbers which make it more realistic.
5. Mixed methods research helps answer questions that cannot be answered by the quantitative or qualitative approach alone and provides a bridge across the sometimes adversarial divide between quantitative and qualitative researchers.

In the past, qualitative and quantitative data were separated from each other and only in recent times have efforts been made to combine both quantitative and qualitative methods to provide a more comprehensive understanding of phenomena. Based on Leech and Onwuegbuzie (2009), mixed methods approaches have been widely used in many disciplines such as health sciences, psychology, sociology, nursing, education, management and organisational research, including library and information science research. Mixed methods research has been increasingly used to answer questions which could not be answered by one paradigm alone. The mixed method approach is highly recognised by leading research methodologists and authors such as Tashakkori and Teddlie (2003), and Creswell and Clark (2007). These researchers predict that

the mixed methods paradigm will be a leading methodology in coming years (Leech & Onwuegbuzie, 2009). In addition, an early study by Rossman and Wilson (1985) identified three reasons for combining quantitative and qualitative research:

1. Combinations are used to enable confirmation of the findings through triangulations.
2. Combinations are used to develop analysis in order to provide richer data.
3. Combinations are used to initiate new modes of thinking that emerge from two data sources.

The combination of both quantitative and qualitative techniques involves triangulation to support research findings. Neuman (2006) defines triangulation as the idea of looking at something from multiple points of view to improve accuracy. Overall, multi-sources of evidence were used in this research: data obtained from school children using questionnaires and observations as well as interviews with teachers.

Triangulation can occur with data, theories, methodologies and investigators. In this study, triangulation occurred where I used different types of data collection: quantitative data in the first phase followed by qualitative data in the second and third phases. Therefore, the collection of data from different sources provided reliability and triangulation for this study (Miles & Huberman, 1984).

### **4.3 Research Paradigm**

Tashakkori and Teddlie (2003) cited at least thirteen authors who propose pragmatism as the mixed method research paradigm or worldview. Furthermore, Guba and Lincoln (1994) claim that both qualitative and quantitative methods are appropriate for any research paradigm:

Questions of method are secondary to questions of paradigm, which we define as the basic belief system or world view that guides the investigation, not only the choices of method but in ontologically and epistemologically fundamental ways. (Guba and Lincoln, 1994, p. 105)

My research is based on the pragmatism paradigm (Creswell & Clark 2007; Saunders et al. 2009; Onwuegbuzie et al., 2006). This is because one of the important principles of pragmatism is the belief that the methods use from both quantitative and qualitative approaches are compatible and researchers are able to use both in their research (Tashakkori & Teddlie, 2010). It is important to “study what interests you and is of value to you, study in the different ways in which you deem appropriate, and use the results in ways that can bring about positive consequences within your value system” (Tashakkori & Teddlie, 1998, p. 30). Pragmatism is typically associated with mixed methods research and the focus is on the question asked rather than the methods; and problems being studied are informed by the use of multiple methods (Creswell & Clark, 2011). Further, it is possible to work within both positivist and interpretivist positions (Saunders et al., 2009).

All paradigms have elements such as ontology, epistemology, axiology, methodology and rhetoric. As my research is a pragmatic paradigm, the elements of worldviews and implications for practice are as follows:

1. The ontological dimension denotes the researcher’s view of the nature of reality and whether or not it is measurable. For a pragmatic worldview, it is believed that it can be both singular and multiple realities as the view is chosen to get the best answer to the research questions (Saunders et al., 2009).
2. The epistemology dimension refers to the researcher’s view regarding what constitutes acceptable knowledge. Practically, the researcher can collect both quantitative and qualitative data according to what works for

the researcher to address the research questions (Creswell & Clark, 2011).

3. The axiology aspect refers to the role of values in research. In the pragmatist paradigm, researchers employ both objective and subjective points of view (Saunders et al., 2009) and incorporate both biased and unbiased perspectives in the research (Creswell & Clark, 2011).
4. The methodology refers to the process of the research. Researchers can combine and collect data using both quantitative and qualitative methods and later mix them (Creswell & Clark, 2007).
5. The rhetoric aspect refers to language that has been used in the research. For this perspective, researchers may adopt both formal and informal styles of writing in their research (Creswell & Clark, 2011).

#### **4.4 Case Study Research**

Research case studies can be used in the exploratory phase of research in order to discover the relevant issues or factors that might apply in other similar situations (Myers, 2009). By definition, Robson (2002, p. 178) adds that the case study functions as “a strategy for doing research which involves an empirical investigation of a particular contemporary phenomenon within its real life context using multiple sources of evidence”. For this research, various data collection techniques were used such as questionnaires, observations and interviews to gain a richer understanding of the context of the research. The rationale for using multiple cases is to establish the findings of the first case and whether it occurs in other cases, leading to the ability to generalise from these findings.

As explained previously, this research employs a qualitative research methodology as a dominant strategy in order to provide better understanding of issues being investigated. It allowed me to gain more interpretation based on teacher interviews. In addition, it allowed me to observe real action taken by the school children in seeking information from the Internet. The appropriate

methodology used in order to obtain information was a case study focusing on specific actions and reactions to the school children's use of the Internet in seeking information for academic purposes. As Saunders and Lewis et al. (2007) describe, the case study strategy has an ability to generate answers to 'why', 'what' and 'how' questions. Therefore, the case studies have distinct characteristics that are ideal in order to answer the 'what' type of question in this research. To adopt a case study approach, Tellis (1997) suggests a number of issues that should be considered:

- Gaining access to the subject organisation
- Ensuring there are sufficient resources while in the field
- Clearly scheduling data collection activities
- Providing for unanticipated events.

Therefore, the case study approach is appropriate to provide answers for the types of questions contained within the questionnaires of this research. It contributes to gaining information regarding the individual and group that are related to the field of study. The case study provides insider information and rich data in order to make sense of real world problems. Yin (1994) suggests that the case study can be designed in two ways: either as a single case study or as multiple case studies. In this research, multiple case designs were employed with each school being the subject of an individual case study, but the study as a whole covered several schools. A multiple case study approach is used to increase the generalisability of findings, and to yield more compelling and robust results rather than a single case study. The rationale for using multiple case studies is to establish whether the findings of the first case occur in other cases and, as a consequence, whether there is the ability to generalise from these findings. In this study, four schools were identified. The unit of analysis consisted of two government schools in Victoria, Australia, and two schools in the Smart Schools program, Malaysia. The four schools form the structure of the multiple case studies approach applied within this research. The case study enables a comparison to be made between the two different countries. All data was analysed separately as individual case analyses

and subsequently as cross-case analysis before being finally interpreted as a final discussion/conclusion using both qualitative and quantitative methods. This is noted in Figures 4.2 and 4.3.

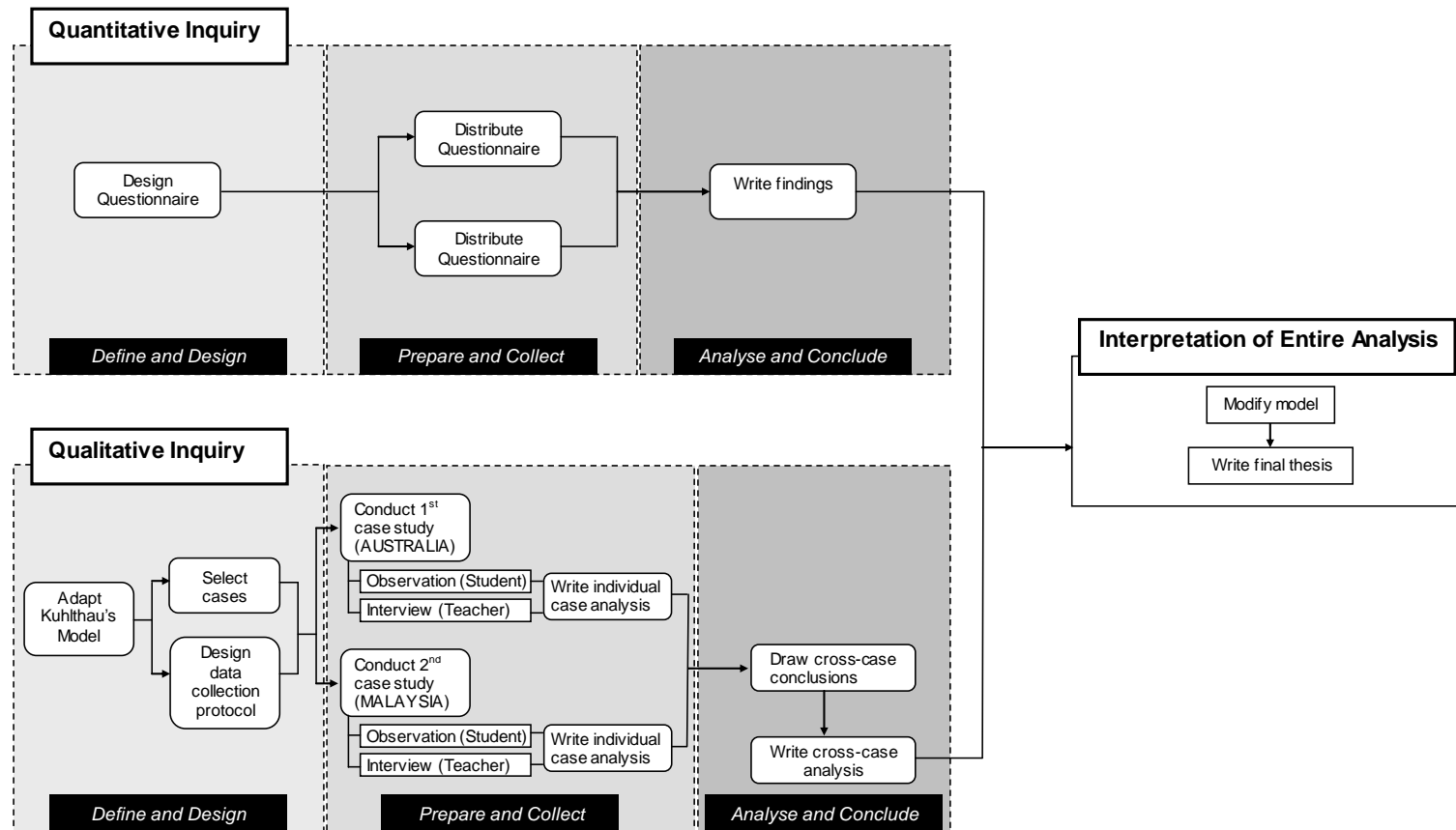


Figure 4.2: Data collection techniques based on case studies in Australia and Malaysia (Adapted from Yin, 2003)

## **4.5 Data Collection Techniques**

There are several possible data collection techniques which could have been employed in this research. My research incorporated questionnaires, observation and interviews. A questionnaire was distributed to primary school children prior to the observations and teachers' interviews. The survey was carried out with primary school children to provide some demographic data and some understanding of approaches to the way they used the Internet for seeking information before one-to-one observations were undertaken. Observations of primary school children were considered to be the primary strategy for data collection in order to get a real picture of how school children seek information from the Internet for academic purposes. Next, I needed to understand the teachers' perspectives of their roles, what strategies were used in the class and what challenges and issues the children faced. This was done through interviews. The three data collection methods reflected Kuhlthau's model of ISP that consists of six stages: initiation, selection, exploration, formulation, collection and presentation. The questionnaires in section C were also designed to follow Kuhlthau's model of ISP (1993). For the observation phase and interviews the checklists related to specific behaviours or actions based on Kuhlthau's model.

### **4.5.1 Questionnaires**

Questionnaires were used for the quantitative data analysis. Based on the target group of primary school children, I used paper-based questionnaires, which were handed to the students individually, and I waited for the questionnaires to be completed for up to 10 minutes. However, some of the primary school children needed assistance to answer, and I approached them by asking the questions and filling in the document based on what they said.

The overall questionnaire is in English language and design was intended to be simple and straightforward in order to avoid confusion for the primary school



children. In developing the questionnaires, I used open and closed-ended questions. Three major categories of close-ended questions were used: dichotomous questions that would allow the respondents to choose from two possible answers; multiple questions which provided a list of possible answers and allow the respondents to select more than one choice from the list; and rank-order questions where respondents are asked to rank each option that applies in order to obtain information on the preferences that help primary school children in seeking information from the Internet. The final part of the questionnaire applied Likert scales as one of the options for closed-ended questions. This is also known as attitude measure (Pickard, 2007, p. 187). The questions required the respondents to choose their responses about the information-seeking processes using the Internet for academic purposes based on a structured response system that commonly uses a five-point scale. However, for primary school children, I measured it based on three-point scales of “always”, “sometimes” or “never”. A three-point scale was used to avoid confusion among the school children. This decision was based on feedback from discussions with the school teachers and I used their judgement to shift from five options to three.

The questionnaires covered issues that reflected the research questions of the study, including information-seeking processes, problems and challenges in seeking information, the appropriate training needed plus opinions and suggestions from respondents on how to improve information-seeking processes for school children. The questionnaire also collected demographic data about the school children (Appendix A). Sections A and B were designed specifically to ascertain student demographic data and knowledge of the Internet used by primary school children from both countries. Meanwhile, in Section C, the items in the questionnaire were selected from Kuhlthau’s previous instruments of the Information Search Process (ISP) for higher education students. However, after discussion with teachers from both countries, some of the questions changed in order to reflect appropriate abilities of primary school children.

The sections of the questionnaire are explained in more detail as follows:

- Profile – The first part of the questionnaire collected the demographics of the respondent. The respondents were categorised by age, grade, gender, school name, computer at home and Internet access at home.
- Internet use and knowledge – This section was designed to find information about the ability, frequency, purpose and challenges regarding the usage of the Internet specifically in the school environment.
- Information-seeking processes – This section was designed to gain insight regarding the perceptions of school children on how they seek information from the Internet in order to complete assignments given by their teachers.

### 4.5.2 Observations

Observation can be used as a data collection method which enables the researcher to see things that participants may be unwilling to discuss (Patton, 1990), and unusual aspects can be noticed during the observation (Creswell, 2003). According to Robson (1997, p. 190), “as the actions and behaviours of people are a central aspect of any enquiry, a natural technique is to watch and record what they do, then analyse and interpret what we observed”. As long as we are interested in people’s information behaviour, direct observation will be useful as a research method (Wildemuth, 2003). Furthermore, as Seefeldt (1998, p. 317) stated:

Young children, who have limited repertoire of behaviours that can be assessed, may be best being studied through observation. ... Further, young children reveal themselves through their behaviours. Unlike older children and adults, the young are incapable of hiding their feelings, ideas, or emotion with socially approved behaviours, so observing them often yields accurate information.

As my research was focused on information-seeking processes undertaken by primary school children, observation was chosen as the best way to discover those processes. The type of observation used in this research was semi-participant observation. I essentially chose the observation technique of watching, interacting in minimum conversation and recording the action of the school children (Pickard 2007). The think-aloud protocol was also used in this study to investigate the search process, strategies and tactics of children seeking information. According to Ericsson and Simon (1984), the think-aloud protocol is used to understand the subjects' cognitive processes based on their verbal reports during the observations. The method of instruction is simple; during the observations I requested the primary school children to speak aloud while they were performing tasks. By using this method it is possible to investigate the reactions, feelings and the kinds of problems and challenges that school children experience while performing a task. The study involved observation of children seeking information from the Internet and viewing navigational skills. They were asked to perform one information-seeking task in the 20-minute session.

There are several ways to record the data from observations. The most common approach is to watch and record using an observation schedule or checklist. My observation was aided by the use of a checklist and note-taking. The purpose of using an observation checklist is to improve the reliability of the data collected by the researcher (Denscombe, 2003). The checklists that I prepared were lists of specific behaviours or actions arranged based on the Kulhthau (ISP) model (see Appendix B). In my checklists, I also included rating scales as one of the observation checklists in order to indicate the level to which children possessed certain behaviours or rated their feelings. Five intervals are often used, with the middle number marked as neutral, and with positive and negative intervals on either side (Beaty, 2010). However, for the primary school children, I indicated three intervals, namely, happy/confident, neutral/normal, sad/frustrated. During the observation session, I watched the school children individually and checked off or circled the point that related to his/her actions or behaviours.

At the same time, I used note-taking or anecdotal records to explain and elaborate more actions taken from the observations. The anecdotal record is a narrative description that is recorded after the behaviours or actions happen. Since it was a 20-minute observation, I attempted to take notes and transcribe the notes immediately after the fieldwork to allow interpretative notes to be added (Pickard, 2007). I was also able to double-check the processes taken by the school children in searching for information from the Internet through the “back button” menu. Once the school children completed their tasks, I then used the “back button” to see how the process was undertaken. The checklist was based on Kuhlthau’s model of six stages and note-taking served as an aide-mémoire that contained extensive detail from the observations. Three sets of tasks were set and prepared by the Malaysian teachers and agreed to by the Victorian teachers based on the level of education/knowledge of the children, with some changes made to task 3 in order to suit the appropriate level of education for primary school children in Victoria. Both ill-defined tasks and well-defined tasks were included. The students were requested to find information on specific topics based on their learning. The tasks are set out in detail in Table 6.1.

Teachers also suggested using the “Smiley Face” Likert scale in order to illustrate primary school children’s feelings. The “Smiley Face” scale was derived from Wong Baker, (1998) to rate satisfaction when evaluating websites.

#### **4.5.2.1 Issues in Observations**

Ethical issues may arise in research, especially when the research involves children. In order to overcome these issues, I obtained a Working with Children permit as required by the Victorian Government, Australia before starting the research. In the letters addressed to the parents and principals, I also clarified that no video or audio-recordings would be made. In addition, the school children were only observed in school, during school hours. Due to the fact that it was difficult to monitor the school children’s actions in order to gather observation data, I employed the think-aloud protocol to augment the actions taken by the school children.

### **4.5.3 Interviews**

Interviews with teachers were undertaken for this research to understand children's information-seeking processes from the teachers' perspectives. In the interview sessions, teachers were made aware of the purpose of an interview; it was believed they could provide the best answers relating to the primary school children's information-seeking processes in the school setting. The teachers' experience was expected to be a dominant source of evidence about how children seek information from the Internet during the class sessions and what kind of problems and challenges that children face.

In this research, I used face-to-face and semi-structured interviews to provide greater flexibility by allowing the conversation to develop within the general focus of the investigation. The use of semi-structured interviews allowed a certain degree of flexibility and also enabled me to probe and prompt the respondents for more information or clarification of their responses. In the semi-structured interviews, my main objective was to investigate the school children's Internet search activities during the class from the teachers' perspectives. In this study, 20 teachers were involved (ten teachers from each country). All the teachers were directly involved in teaching subjects that included use of the Internet. In Malaysia, teachers who teach Malay and English languages have been assigned to use the Internet when teaching the school children as mentioned in Chapter 2. In Victoria, the classroom teachers have been assigned to teach all subjects using the Internet appropriately. In addition, schools in the Victorian government education system have been provided with ICT teachers to teach ICT as one subject. The teachers' interviews were conducted individually and took place in a school area such as the teacher's room, computer laboratory, classroom or school hall. Before the interview session started, I explained the purpose of the study and the data collection process and asked him or her to give signed consent as agreement to become one of respondents in the study. The interview session was recorded, and augmented with simultaneous note-taking. The semi-structured interview questions (Appendix C) included:

1. Questions about the teacher's teaching experience.
2. Questions about the teacher's teaching using the Internet for assignments.
3. Questions about the teacher's perception of school children's problem and challenges when using the Internet.
4. Questions about the teacher's role related to the use of the Internet in the classroom and the training they needed.

For the interview sessions, two languages were used. In Malaysia, the Malay language was used as the medium for all interviews except one, as it was the preference of most of the Malaysian teachers, except for one teacher who preferred to use English. In the interviews in Australia, the English language was used. Each interview lasted an average of between 30 and 45 minutes.

#### **4.6 Ethics Clearance**

This research obtained ethical clearance from the Malaysian and Victorian education departments and from RMIT University. I also obtained a Working with Children permit in Victoria, since the research involved contact with children. This permit is a compulsory minimum verification standard for those who intend to work with children in Victoria. This system was introduced in 2006 by the Victorian Government to help protect children under 18 years of age from physical or sexual harm. After gaining ethics clearance and the Working with Children permit, I wrote to the school principals explaining the purpose of the research. I also provided the principals with a copy of the Plain Language Statement (Appendix D) and the consent form (Appendix E) to distribute to parents. The principals and the teachers then approached parents with a Plain Language Statement and a consent form to be completed and signed, as the primary school children were under 18 years old. In the letters I explained that the results from the sessions would be reported as group results only and that the participants and the school would not be identified by name. I explained that all data would be stored for at least five years, and that it would be stored securely

with printed data kept in locked cabinets and electronically stored data requiring password access known only to the researcher. On the observation days, I met with the teachers and explained to them that they were not participating in the session. The teachers were only involved in the interview sessions. Overall, the teachers gave their full commitment and were helpful in providing information.

## **4.7 Procedure for Data Collection**

Data collection commenced after ethics clearance was obtained and consent forms were returned by principals and parents. The procedures for the data collection (questionnaires, observations and interviews) is explained in the next section and Figure 4.3.

### **4.7.1 Questionnaires and Observation Procedures**

After receiving consent forms from parents, I conducted a briefing session with the primary school children to introduce myself and explain the purpose of the research and the data collection process. The briefing session was conducted in English in the schools in both countries. At the end of the briefing sessions in the Malaysian schools, I explained again in Malay language to ensure that the participants understood well and to avoid any confusion. The children were told that there was no pressure and that there were no right or wrong answers. Before starting the observation of the school children, they were asked to answer a simple questionnaire including questions of a demographic nature and questions about the challenges they found when using the Internet to complete tasks given by teachers.

The observations were carried out one at a time in a room that had a computer with Internet access. After receiving the tasks set by their teacher, the school children spoke aloud about what they were thinking. However, several of children chose not to do so. The study involved observations of children seeking information from the Internet and viewing navigational skills; participants were

asked to perform one information-seeking task in the 20-minute session. During the session, participants discussed the activities they were performing while completing the task. Each student had to perform one of the three tasks as articulated in Table 6.1. The tasks were given randomly to them in a 20-minute session. I personally conducted both sessions. Results from the sessions were reported as group results only and the participant or the school were not identified by name.

#### **4.7.2 Interview Procedures**

I personally conducted the interview sessions that took place in the respective schools. The times and venues for the interviews were based on the convenience of the teachers: some were in teachers' rooms, some were in the computer labs, and some were in the classrooms (after school hours). Before the interview days, I made the arrangements and identified the relevant teachers as indicated by the principals. The teachers' interviews were done individually. Before asking questions, I explained to the teachers the purpose of the study, that the interviews would be audio-recorded, that all the data would be confidential and that the participant would remain anonymous. All of the teachers agreed to be interviewed and signed the consent form to participate in the research. The transcripts for each interview were prepared immediately after completing the interview sessions, and were kept in hard and soft copies at a secured location in my university office.

### **4.8 Development of Themes**

Thematic analysis is applied in this research as a process for encoding qualitative information. The encoding requires elements such as a list of themes, a complex model with themes, and indicators that are causally related (Boyatzis, 1998). A theme is a pattern found in the information that will describe and interpret aspects of phenomena. As mentioned in before, this research utilises theory and prior research-driven approaches as a means of developing the themes (Boyatzis, 1998). The themes are identified based on Kuhlthau's model of six stages of information



search process. The first step of this approach is to generate a coding scheme from Kuhlthau's model as described in the following sub-sections.

#### **4.8.1 Initiation Stage**

Based on Kuhlthau's model, the first theme is task initiation. Task initiation is the phase when a student first recognises the kind of information that is needed to complete an assignment. The student reads over the assignment in order to understand the task before attempting it. The student may recall previous assignments or talk to friends and the teacher in relation to the required tasks. In this phase, the student gathers information in order to identify possible general alternatives regarding the topic of the assignment.

#### **4.8.2 Selection Stage**

The next stage is the selection stage. During the selection stage, the task is to identify and select a general topic to be investigated, approached and pursued. Students begin their search based on the assignment's requirements, available information, time allotted and potential topics for investigation.

The requirements of the assignment set by teachers encourage students to recall prior knowledge and experience in order to select the topic and which relevant Internet sites that they should visit. Choosing the search system is dependent on the ability of the individual students. Domain knowledge is the most important in selecting a search system and focusing the search. Based on the requirement of the assignments, students search for the type and range of information that is available in order for them to fulfill the demands of the assignment. In addition, students need to plan how to complete the assignment in the given timeframe. This may or may not lead to the discovery of future potential topics that can be explored.

### **4.8.3 Exploration Stage**

The exploration stage is the third stage of Kuhlthau's model and the task in this stage is to investigate information on a general topic in order to extend understanding or to form a focus. Students search for information from different sites and collect as much relevant information as they can in order to complete their assignment. For this process, in order to locate the information, the students are required to read and take notes based on discovered facts relevant to the assignment. Hence, students are forced to focus not only on their topic of investigation but to become selective in the type of information they find.

### **4.8.4 Formulation Stage**

The formulation phase is the turning point of the search process. The student's task in this stage is to form a focus based on the information encountered. Students are required to choose the best possible information based on their own knowledge and judgement, the requirements of the assignment, and the allotted time. Students are also able to combine a variety of gathered information to form a summary in order to complete the assignment. When students are unable to form a focus during the search process, they commonly experience difficulty when they want to present their findings.

### **4.8.5 Collection Stage**

During the fifth stage – collection – the task is to collect and gather information pertaining to the focus of the task. Students collect information from the Internet, gathering, defining and summarising it in order to complete the assignment. In doing so, the students apply skills such as reading, scanning, classifying, copying and storing the information. As the information is extracted it is integrated into the student's knowledge through the synthesis of the stages mentioned above.

#### **4.8.6 Presentation Stage**

The last stage is presentation, during which the students' task is to complete the search process and to prepare a presentation of their findings. Students stop searching when they feel they have located sufficient information and then they organise the information based on the requirements of the assignment, and prepare it for submission before the end of the class session or the due date.

#### **4.9 Sample Selection**

I used the non-probabilistic sampling strategy, which is commonly known as purposive sampling. Based on Neuman's description (2006, p. 22), purposive sampling is "a valuable kind of sampling for special situations and it is used in exploratory research for the judgement of the selected sample population". Purposive sampling was used in this research because the respondents were selected on the basis that they could provide the best information for answering the research questions (Teddlie & Tashakkori, 2010; Patton, 2002). According to Teddlie and Tashakkori (2010), there are four main characteristics of purposive sampling:

1. It focuses on specific purposes related to the research questions and the researcher will choose the respondents who can provide rich information related to the questions.
2. The researcher uses their own judgement regarding whom to choose as the right respondents.
3. The main purpose of the purposive sampling procedure is to get the best and most detailed understanding from each respondent.
4. The sample size is relatively small, depending on the research questions and design.

In this research, the respondents included students and teachers from four selected schools in Malaysia and Australia as they were considered to be exposed to and

have experience of the phenomena under investigation (that is, information-seeking processes from the Internet in school setting) (Creswell & Clark, 2007). The survey questionnaires involved 67 primary school children in Malaysia and 56 primary school children in Australia and the observations involved 30 primary school children in Malaysia and 27 in Victoria, Australia. The figures differed due to absenteeism and time constraints as the observation sessions were carried out during school hours. The interview sessions involved 20 teachers (10 teachers in each country). A breakdown of the respondents is shown in Table 4.1.

Due to the ethical guidelines, the detailed information of the respondents was to be anonymous. Therefore, the participants were identified by codes as follows:

1. For Malaysian primary school children, the codes were MSIA1 to MSIA67.
2. For Australian primary school children, the codes were AUS1 to AUS56.
3. For Malaysian teachers, the codes were: MSIAT1 to MSIAT10.
4. For Australian teachers, the codes were AUST1 to AUST10.

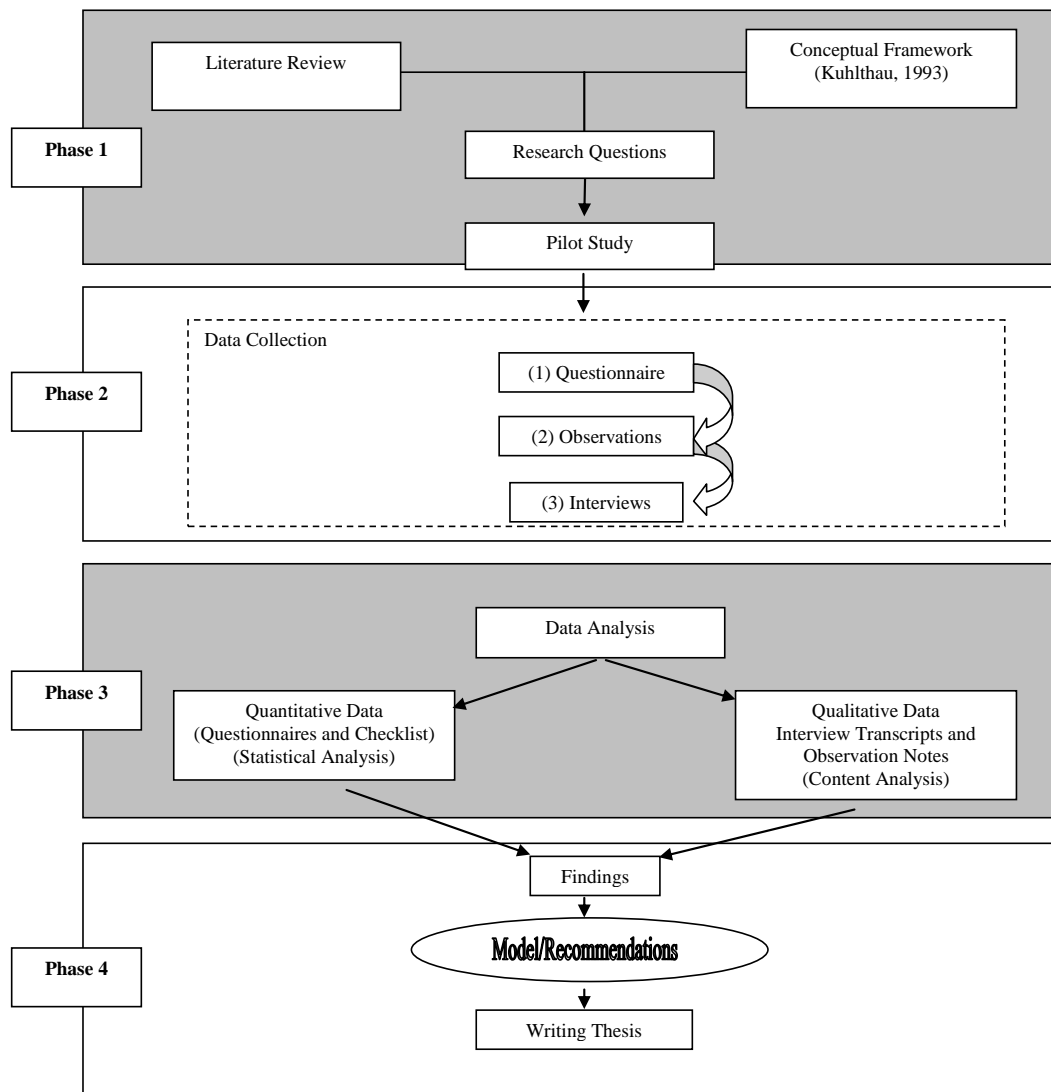
<b>Country</b>	<b>School</b>	<b>Respondents</b>	<b>Respondents</b>
MALAYSIA Students (67)  Teachers (10)	School A (35)	Students Grade: 5 (11 years) Grade: 4 (10 years)	Teachers
	School B (32)	Students Grade: 5 (11 year) Grade: 4 (10 years)	Teachers
AUSTRALIA Students (56)  Teachers (10)	School A (39)	Students Grade: 5/6 (11-12 years) Grade: 3/4 (9-10 years)	Teachers
	School B (17)	Students Grade: 5/6 (11-12 years) Grade: 3/4 (9-10 years)	Teachers
<b>TOTAL</b>	<b>4</b>	<b>123</b>	<b>20</b>

**Table 4.1: Respondents from Malaysia and Australia**

The ages of the school children in the same grade number are different in Malaysia and Australia as explained previously in Chapter 2. However for this research the age group of the participants is the same, 10 to 12 years old for observations session. For survey questionnaires it applied to all respondents for students grade 3/4 till 5/6 for Australian schools and grade 4 till 5 in Malaysia. The differences of these grades are due to the class composition according to Victoria education Systems and Malaysia education systems. Due to examination restrictions and procedures in Malaysia, students in Grade 6 were excluded from this study.

## 4.10 Research Design

The research design is illustrated in Figure 4.3.



**Figure 4.3: Research design**

(Adapted from Pickard, 2007)

#### **4.10.1 Phase 1: Initial and Pilot Study**

The initial study was designed to investigate and identify schools that used the Internet as part of the school children's learning processes. In the Victorian education system, all schools are equipped with an Internet service called FUSE site, formerly known as Connect, which is provided by the VicSmart broadband network. VicSmart is part of the Victorian Government's commitment to implementing broadband services and is supported by its network partner, Telstra. The FUSE site links to many online resources which have games, activities and information for projects and assignments for primary school children. (<https://fuse.education.vic.gov.au/primary/pages/Default.aspx>).

In identifying the sample, I gained permission from the Department of Education and Early Childhood Development and permission letters were subsequently sent to the principals of each school. Out of the eight schools that I approached in the northern metropolitan public primary school region in Victoria, two schools gave their permission. However, it was a different scenario in Malaysia. As mentioned in Chapter 1, only schools in the Smart School program, that is, schools that were fully equipped to use ICT, were selected. There are only two such primary schools in Malaysia and both consented to participate in the research.

The pilot study was conducted to determine the effectiveness of the questionnaire in terms of its validity. It was also carried out to consider whether the questions need to be reworded, whether the question format was appropriate and whether the language and level of comprehension of the questions were suitable for the targeted age groups of the primary school children. The pilot study was conducted with twelve school children and four teachers (to validate the questionnaires) from both countries. It was carried out in March 2009 in Australia and in June 2009 in Malaysia, after gaining ethics approval from the Education Departments in both countries. The pilot study provided detailed feedback on the clarity of the questions and the overall comprehensibility of the instrument. The questionnaire was found appropriate and valid according to the pilot study results, although, on

the advice of the teachers in the pilot study, some wording within the questionnaire was changed.

### **4.10.2 Phase 2: Data Collection**

The data collection phase consisted of implementing the survey questionnaire, followed by one-to-one observations of the school children, and the teacher interviews. In the four schools involved in this research there was a total of 123 school children and 20 teachers from both countries involved. It was carried out after ethics clearance and completion of the pilot study, from April 2009 to July 2009. The first data collection was the survey questionnaire and later the observations of the primary school children. The observations took 20 minutes per child, in their school's computer room with Internet access. However, some of the school children managed to complete their tasks in less than 20 minutes. The observations are discussed in detail in Chapter 6. The teacher interview sessions were carried out after completing the observation sessions.



### **4.10.3 Phase 3: Data Analysis**

There are three parts to the analysis of the data, as identified below:

1. Questionnaires – The findings from the questionnaires were analysed through the Statistical Package for Social Science (SPSS) statistical software package version 18.0. The program was used to perform a series of statistical analyses on the data, including descriptive statistics. Further analysis was made to determine whether significant relationships or differences existed between Australian and Malaysian primary school children, using, the Mann Whitney U-test, a non-parametric test. Applying the test, the minimum level of significance was set at 0.05.
2. Observation – For observation, I used a checklist and note-taking. A checklist “is a list of behaviours with checkmarks, recorded before, during and after behaviour occurs” (Beaty, 2010, p. 40). The purpose of using the checklist in my research was to determine the existence or not of expected behaviours when observing the primary school children. The advantages of using a checklist are that it is simple to use, I can clearly see what I am looking for and there is no need for special training to use it. At the same time I used note-taking to take notes and make anecdotal records. According to Beaty (2010, p. 26), “anecdotal records are brief narrative accounts describing an incident of child behaviour that is important to the observer”. These descriptive narratives were recorded after the behaviours occurred. I did this to explain in more detail about the specific behaviours of the primary school children when seeking information from the Internet. The advantages of note-taking are that it provides open-ended information, and the data collection is not restricted to one kind of behaviour, especially when an unexpected outcome occurs.
3. Interviews – The interviewing process was digitally recorded to facilitate the transcription analysis. Thematic coding was used as a process for organising qualitative information. According to Boyatzis (1998), “the

encoding requires an explicit ‘code’ that may be a list of themes”. A theme is a pattern found in information that describes and interprets aspects of the phenomena in which the researcher is interested. For my research, the themes were derived from Kuhlthau’s model of six stages: initiation, selection, exploration, formulation, collection, and presentation. According to Boyatzis (1998), there are five purposes for thematic analysis:

1. As a way of seeing
2. As a way of making sense out of seemingly unrelated material
3. As a way of analysing qualitative information
4. As a way of systematically observing a person, an interaction, a group, a situation, an organisation or a culture
5. As a way of converting qualitative information into quantitative data.

In the type of thematic analysis used for this study, the purpose is to enable the analysis of qualitative information by encoding its findings. In order to develop a thematic code, Boyatzis (1998) suggests three different ways to be considered:

1. Theory driven.
2. Prior data or prior research driven.
3. Inductive (from the raw data) or data driven.

For the coding process, I used the model based on Kuhlthau’s ISP, consisting of six stages: initiation, selection, exploration, formulation, collection and presentation. I followed the work of Boyatzis (1998) as the main elements of the coding were theory driven, based on Kuhlthau’s model. Later, I coded the responses manually using Microsoft Excel to compare and contrast the findings with Kuhlthau’s six stages of ISP. The six categories are listed and described in Table 4.2.

Stage	Task
1. Initiation	To prepare for the decision of selecting a topic
2. Selection	To decide on topic for research
3. Exploration	To investigate information with the intent of finding a focus
4. Formulation	To formulate a focus from the information encountered
5. Collection	To gather information that defines, extends and supports the focus
6. Presentation	To conclude search for information

**Table 4.2: Categories of Information Search Processes**

(adapted from Kuhlthau, 1993)

### **4.11 Validity and Reliability**

In this research, Cronbach's alpha analysis was used to test the reliability of the study for the quantitative measurement. However, the majority of the Cronbach alpha figures for this study were slightly lower than those of normative samples. According to Burns and Grove (2001), every measure has a small amount of systematic error. This could account for the slightly lower Cronbach alpha figures and mixed methods were used to protect against systematic error.

In this study, techniques such as cross-case examination help to ensure the external validity. This was obtained from multiple case studies where four schools present a range of contexts. Reliability refers to stability, accuracy and precision management (Yin, 1994). During phase 1 of this study, I was able to test and conduct the pilot study and obtain information to design the instrument. In summary, the processes were undertaken to ensure the validation and the reliability of the quantitative and qualitative instruments as follows:

- The questionnaire – Some wording within the questionnaire had to be changed as a result of the pilot study. The pilot study provided detailed feedback on the clarity of the questions and the overall comprehensibility of the instrument. This was checked by teachers from Australia and Malaysia.

- The observations – The think-aloud protocol was used to investigate the search process of school children seeking information on the Internet. By using this method it was possible to investigate the reactions, feelings and the kinds of success factors, problems and challenges that the school children experienced while performing the task.
- The interviews – The interviews were recorded and some responses were clarified during the interview session to confirm the information.

## **4.12 Summary**

This chapter describes the research approaches, design, data collection techniques, data management and analysis, and ethical issues. As explained, a mixed methods approach and design was used in this study in order to determine the information-seeking processes of primary school children using the Internet for their academic purposes. The combination of both quantitative and qualitative research provides an opportunity for better understanding of research problems and is appropriate for answering the research questions. The methods used for data collection were questionnaires, observation and interviews. The participants involved were primary school children and teachers from Australia and Malaysia. This research design started with a broad survey of the background of primary school children, their knowledge, usage and challenges when using the Internet for academic purposes in school settings. Later, it focused on observations and interviews to gain more detail about primary school children's seeking information from the Internet. Since this research employed a quantitative approach first, the quantitative findings are presented in the next chapter.

## **5 Primary School Children's Information-Seeking Process: Students' Perspectives**

### **5.1 Introduction**

This chapter presents a quantitative descriptive analysis of how school children seek information from the Internet for academic purposes. According to Neuman (2006), the main reason for using descriptive research is to “paint a picture” using words and/or numbers, allowing the creation of a profile that is clearly presented in graphs or tables. Wildemuth (2009) further supports this by indicating that the role of descriptive statistics as the first step in data analysis is to summarise results. There are three main sections in this chapter. First, a profile of the school children involved in the research is presented, including their backgrounds. Second, the children's knowledge, usage and the challenges of using the Internet in a school environment are discussed; and third, the children's information-seeking processes for academic purposes are identified.

Approximately 200 permission slips were distributed to parents and 123 were returned. After obtaining permission from the parents and a discussion with the relevant class teachers, the distribution of the questionnaires was carried out by the teachers who also gave the primary school children time to complete the questionnaires. It took the school children approximately 10 minutes to answer the questions.

All of the results were analysed using the Statistical Package for Social Sciences (SPSS) version 18.0. Ranges of descriptive analysis were presented using frequencies, cross tabulation and graphs to examine the distribution of the responses. To support these analyses, statistical hypotheses such as the Mann-Whitney U test, which is also known as the Wilcoxon rank sum test (McKnight & Najab, 2010) was used to test for differences between two group variables

between Malaysia and Australia. Section A, B and C discuss the findings derived from the questionnaires.

## 5.2 Section A - School Children's Background

Table 5.1 presents background information about the school children in terms of the basic demographics of age and gender. Out of the four sample schools identified, a total of 123 primary school children were involved in this study. Sixty-seven primary school children from Smart Schools, Malaysia and 56 students from Victorian government schools, Australia. The gender breakdown of the students involved in this study was 72 female children (58.5%) and 51 male (41.46%). The age groups of these primary school children ranged from 9 to 12 years, with 15 school children (12.20%) being 9 years old, 41 school children (33.33%) 10 years, 55 school children (44.72%) 11 years, and 12 school children (9.76%) 12 years old.

Variable	Measurement	Malaysia	Australia	Number of cases	Percent
<b>Age</b>	9	0	15	15	12.20
	10	29	12	41	33.33
	11	38	17	55	44.72
	12	0	12	12	9.76
		<b>67</b>	<b>56</b>	<b>123</b>	<b>100</b>
<b>Gender</b>	Female	39	33	72	58.54
	Male	28	23	51	41.46
		<b>67</b>	<b>56</b>	<b>123</b>	<b>100</b>
<b>School</b>	SMSIA1	35	0	35	28.46
	SMSIA2	32	0	32	26.02
	SAUS1	0	39	39	31.70
	SAUS2	0	17	17	13.82
		<b>67</b>	<b>56</b>	<b>123</b>	<b>100</b>

**Table 5.1: School children's backgrounds by age, gender, and school in Malaysia and Australia**

Table 5.2 provides information regarding the school children's access to a computer and the Internet. The study involved 67 students (54.48%) from two Smart Schools in Malaysia and 56 students (45.52%) from two government-funded primary schools in Victoria, Australia, with the grades of the school children ranging from Grade 3 to Grade 6.

Variable	Measurement	Malaysia	Australia	Number of cases	Percent
<b>Attending school</b>	<1 year	5	3	8	6.5
	1 year	2	6	8	6.5
	>1 year	60	47	107	87
		<b>67</b>	<b>56</b>	<b>123</b>	<b>100</b>
<b>Computer at home</b>	Yes	60	52	112	91.05
	No	7	4	11	8.95
		<b>67</b>	<b>56</b>	<b>123</b>	<b>100</b>
<b>Internet at home</b>	Yes	44	42	86	69.91
	No	23	14	37	30.08
		<b>67</b>	<b>56</b>	<b>123</b>	<b>100</b>

**Table 5.2: School children's experiences**

A majority of the school children (107, or 87%) had been in their respective schools for more than one year, allowing them to be familiar with the education system of the school and to have experienced using the Internet in that school setting. The majority of the school children (91.05%) reported having a computer at home, suggesting they had experience using computers and had some computer-literacy from what they had learnt from home. A total number of 86 school children (69.91%) had a computer with Internet access at home. The remaining 37 school children (30.08%), however, indicated that they did not have Internet access at home. This can be shown in Figures 5.1 and 5.2 below.

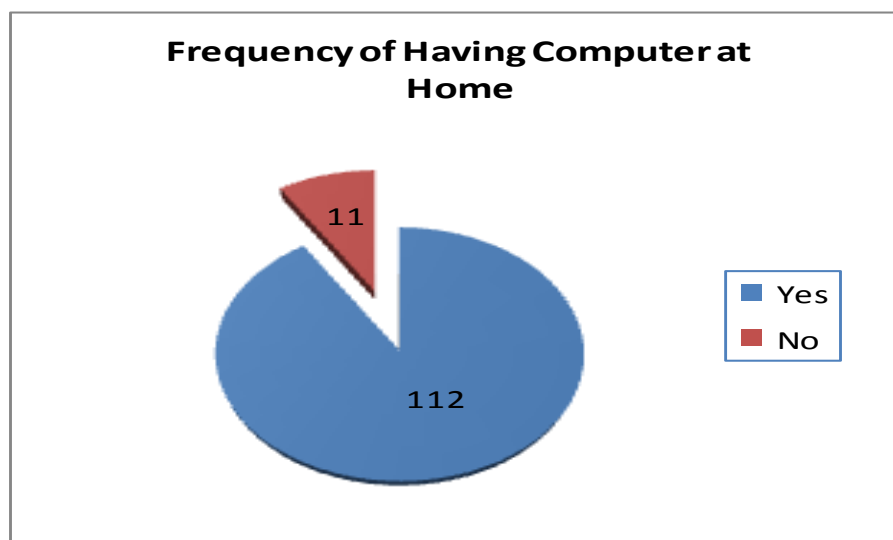


Figure 5.1: Frequency of having computer at home

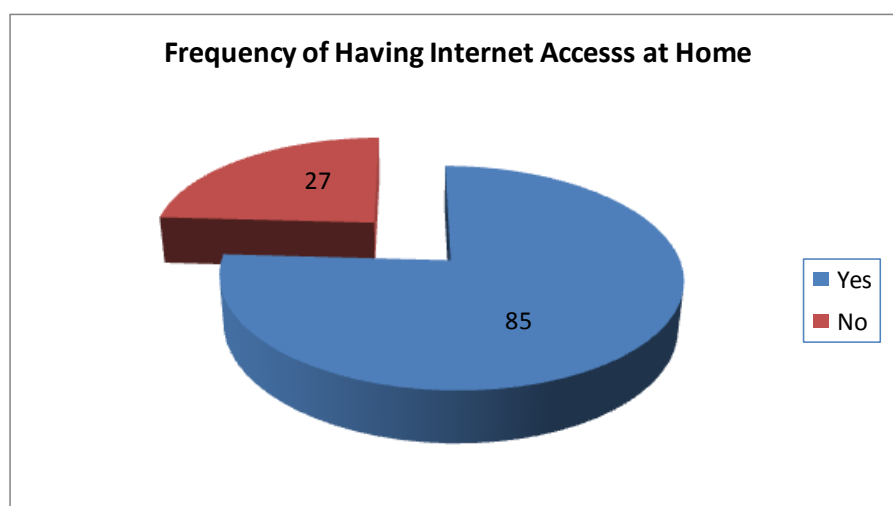


Figure 5.2: Frequency of having Internet access at home

### 5.2.1 Having Computer and Internet Access at Home (Computer vs Internet)

Out of 123 students, 112 (91.05%) students had a computer at home. Of this group, about 75.89% (85 students) had Internet access at their home, whereas 24.11% (27 students) did not have Internet access at home.



### 5.3 Section B - School Children's Knowledge, Usage and Challenges of the Internet

Table 5.3 presents the school children's experiences based on their Internet usage at school. The primary school children answered questions about Internet usage in school, and what they found most challenging when they had to use the Internet to seek information for academic purposes, such as homework and school projects that had been assigned by their teachers.

Variable	Measurement	Malaysia	Australia	Number of cases	Percent
<b>Internet Ability</b>	Low Skill/Beginner	1	4	5	4.07
	Moderate	61	39	100	81.30
	Expert	5	13	18	14.63
<b>Frequency of Use</b>	More than 5 times a week	1	2	3	2.44
	3-5 times a week	12	9	21	17.07
	Twice a week	35	22	57	46.34
	Once a week	19	17	36	29.27
	Never	0	6	6	4.88
<b>Purpose</b> (Tick more than one answer)	Assignment	61	44	105	85.37
	News	15	5	20	16.26
	Email	39	14	53	43.09
	Entertainment	47	29	76	61.79
	Others	10	5	15	12.20
<b>Subject</b> (Tick more than one answer)	Science & Technology	34	12	46	37.40
	Mathematics	15	12	27	21.95
	Language	39	15	54	43.90
	History	22	19	41	33.33
	Others	15	22	37	30.08

## Primary School Children's Information-Seeking Process: Students' Perspectives

Variable	Measurement	Malaysia	Australia	Number of cases	Percent
<b>Resources</b>	Library Catalogue Online	12	15	27	21.95
(Tick than one answer)	Online Database	8	0	8	6.50
	Internet	41	41	82	66.67
	CD-ROMS	18	2	20	16.26
	Others	6	5	11	8.94
<b>Assist by based on first ranking</b>	Teachers	14	25	39	31.71
	Teacher-Librarians	1	0	1	0.81
	Parents/Guardians	24	7	31	25.20
	Friends	10	3	13	10.57
	Myself	13	16	29	23.58
	Others	5	5	10	8.13
<b>Challenges</b>	Network Accessibility	33	14	47	38.21
	Less facilities (computer)	11	14	25	20.33
	Less skills	27	16	43	34.96
	Others	6	17	23	18.70

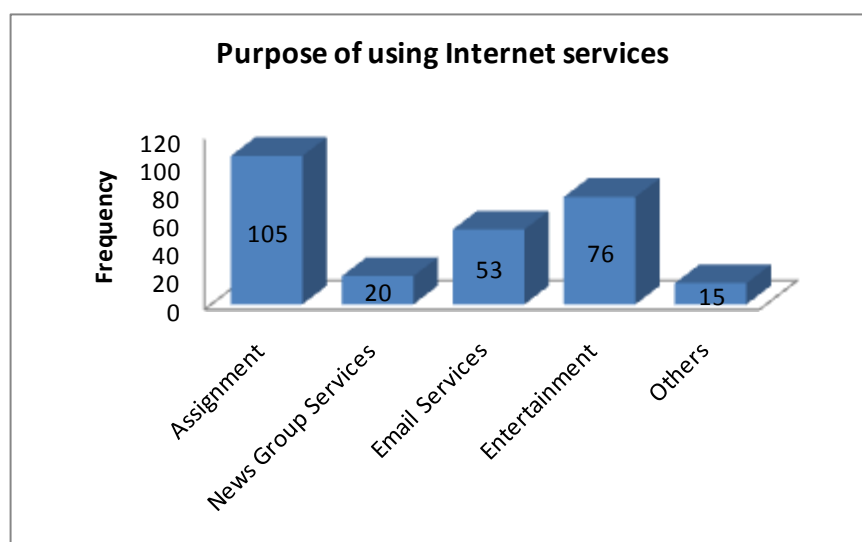
**Table 5.3: School children's knowledge, usage, challenges of using the Internet**

A majority of the school children (100 or 81.3%) claimed that they had moderate skill with regard to their Internet ability. This was followed by 18 school children (14.63%) who believed they were experts and five school children (4.07%) who considered themselves less skilled or at the beginner level.

On average, 35 school children (52.2%) from Malaysia and 22 school children (39.3%) from Australia used the Internet twice a week, followed by 19 Malaysian school children (28.4%) and 17 Australian school children (30.4%) who used it once a week. This demonstrates that there was a similarity with regard to the

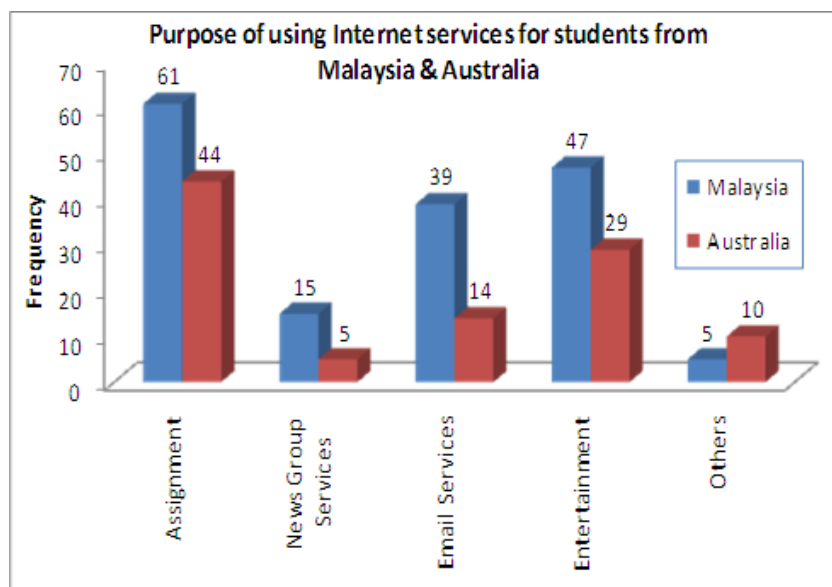
amount of time allocated to the school children's use of the Internet within the school environment in both countries. Unexpectedly, six school children (10.7%) from Australia stated that they had never used the Internet at school.

### 5.3.1 Purpose of Using the Internet in the School Environment



**Figure 5.3: Frequency of purpose of using the Internet in the school environment**

As shown in Figure 5.3, among the school children from both countries overall (a total of 123 school children), 105 school children (85.37%) revealed that the purpose in seeking out information on the Internet was to fulfil the requirements of school assignments. This was followed by 76 school children (61.79%) who accessed entertainment sites, 53 (43.09%) who used email services, (16.29%) followed by accessing news and other purposes (12.20%) such as games. Further analysis was carried out to determine the differences between all purposes of using the Internet between Malaysian and Australian primary school children.



**Figure 5.4: Comparison of purpose of using Internet services between Malaysian and Australian primary school children**

As shown in Figure 5.4, in relation to all the purposes of using Internet services there are differences between the Malaysian and Australian students. Malaysian students showed a higher frequency of use for all purposes except for “other purposes”. A statistically significant difference is shown between the groups in relation to using the Internet for email services, entertainment and assignments.

With reference to Figure 5.4, based on the research done on that sample of respondents, we can see that the purposes for using Internet services were different between Malaysian and Australian students. To confirm if there was a significant difference in the purpose of using the Internet as a source of information between students from Malaysia and Australia, the Mann-Whitney U test was applied. Table 5.4 shows the ranks for each sample in accordance with its respective variable.

Ranks				
Variable	Origin	Total observations	Mean rank	Sum of ranks
Using Internet services as a source of information for assignments	Malaysia	67	58.51	3920.00
	Australia	56	66.18	3706.00
	Total	123		
Using Internet services as a source of information for news	Malaysia	67	58.23	3901.50
	Australia	56	66.51	3724.50
	Total	123		
Using Internet services as a source of information for email	Malaysia	67	52.70	3531.00
	Australia	56	73.13	4095.00
	Total	123		
Using Internet services as a source of information for entertainment	Malaysia	67	56.86	3809.50
	Australia	56	68.15	3816.50
	Total	123		
Using Internet services as a source of information for "other" purposes	Malaysia	67	64.91	4349.00
	Australia	56	58.52	3277.00
	Total	123		

**Table 5.4: Ranks for each sample in accordance with its respective variable (purpose)**

Table 5.5 shows the results of the Mann-Whitney U test with the null hypothesis that two independent samples come from the same population. From the test statistics, three variables are significant which indicate rejection of the null hypothesis: where the p-value is less than  $\alpha$ ; 0.05. Therefore, it is concluded that there was a significant difference between the variables as follows:

1. There was a significant difference in purpose of using Internet services for news between primary school children in Malaysia and Australia.
2. There was a significant difference in purpose of using Internet services for email services between primary school children in Malaysia and Australia.

3. There was a significant difference in purpose of using Internet services for entertainment between primary school children in Malaysia and Australia.

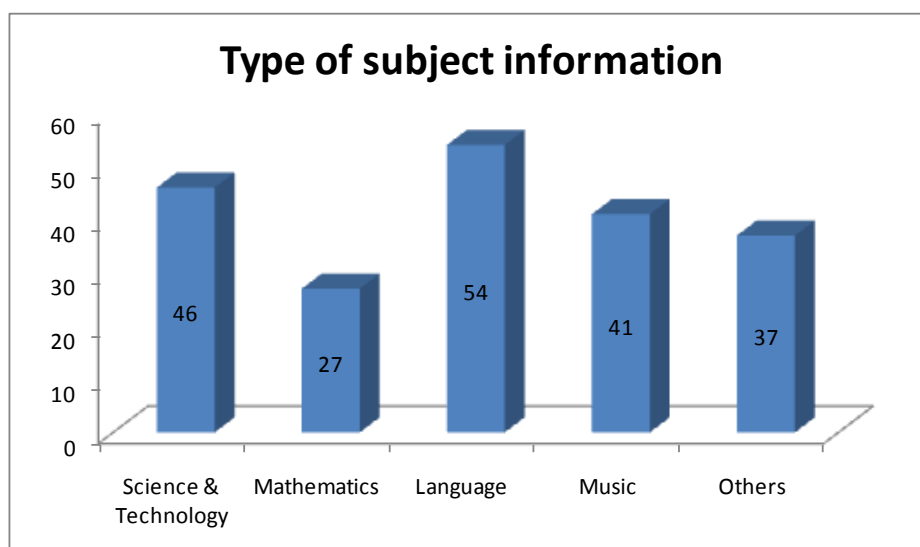
In addition, it is noted that there were no significant differences in purpose of using Internet services for assignments and “other purposes” between primary school children in Malaysia and Australia.

Variable	Wilcoxon W	Z	p-value
Using Internet services as a source of information for assignments	3920.00	-1.941	0.052
Using Internet services as a source of information for news	3901.50	-2.006	0.045
Using Internet services as a source of information for email	3531.00	-3.689	0.000
Using Internet services as a source of information for entertainment	3809.50	-2.079	0.038
Using Internet services as a source of information for “other purposes”	3277.00	-1.747	0.081

**Table 5.5: Results for non-parametric analysis using the Mann-Whitney U test (purpose)**

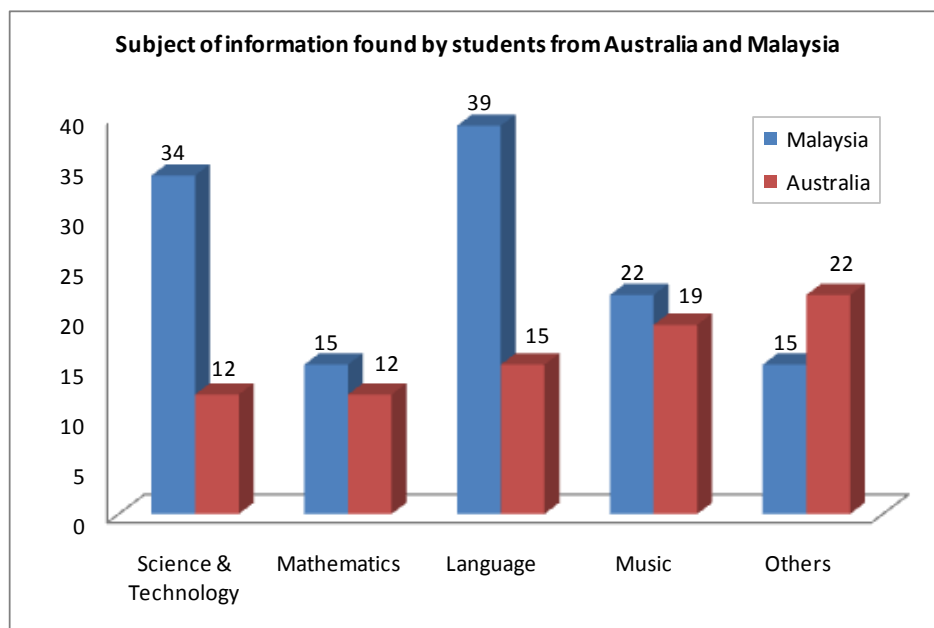
### 5.3.2 Type of Information

Overall perspectives regarding the type of information accessed by the school children on the Internet are shown in Figure 5.5, where the highest number of students visited the Internet for Language information (54 students or 43.9%), followed by 46 students who searched the Internet for Science and Technology information and 41 students who searched for Music information. The frequency distribution between these types of information was only slightly different.



**Figure 5.5: Type of subject information**

When asked further as to the type of subject information accessed from the Internet, the feedback from the school children was significantly different between the countries. Thirty-nine (58.21%) Malaysian school children identified that they looked for information on Language; 34 (50.74%) school children explore Science and Technology, whereas in Australia, 22 of the school children (39.29%) searched for other types of information such as Integrated Studies, and 19 of school children (33.92%) used the Internet for History. These results are shown in Figure 5.6.



**Figure 5.6: Type of subject information between primary school children in Malaysia and Australia**

As shown in Figure 5.6, there were significant differences in the frequency of Science and Technology and Language as subjects sought by the students in each country. There was a slight difference between the students from Malaysia and Australia in regard to looking for information about Mathematics, Music and “Others”. Further analysis was carried out to see if there was any statistically significant difference between countries of origin according to the type of information. Table 5.6 shows the ranks for each sample in accordance with its respective variable. Table 5.7 shows the results of the Mann-Whitney U test.



## Primary School Children's Information-Seeking Process: Students' Perspectives

Ranks				
Variable	Origin	Total observations	Mean rank	Sum of ranks
Searching for Science and Technology information	Malaysia	67	53.79	3604.00
	Australia	56	71.82	4022.00
	<b>Total</b>	<b>123</b>		
Searching for Mathematics information	Malaysia	67	61.73	4136.00
	Australia	56	62.32	3490.00
	<b>Total</b>	<b>123</b>		
Searching for Language information	Malaysia	67	53.20	3564.50
	Australia	56	72.53	4061.50
	<b>Total</b>	<b>123</b>		
Searching for Music information	Malaysia	67	62.31	4174.50
	Australia	56	61.63	3451.50
	<b>Total</b>	<b>123</b>		
Searching for Other information	Malaysia	67	66.73	4471.00
	Australia	56	56.34	3155.00
	<b>Total</b>	<b>123</b>		

**Table 5.6: Ranks for each sample in accordance with its respective variable (type of subject)**

Variable	Wilcoxon W	Z	p-value
Searching for Science and Technology information	3604.00	-3.333	0.001
Searching for Mathematics information	4136.00	-0.128	0.899
Searching for Language information	3564.50	-3.483	0.000
Searching for Music information	3451.50	-0.128	0.899
Searching for other information	3155.00	-2.027	0.043

**Table 5.7: Results for non-parametric analysis using the Mann-Whitney U test (type of subject)**

Table 5.7 shows the results of the test with the null hypothesis that two independent samples come from the same population. From the statistics, three

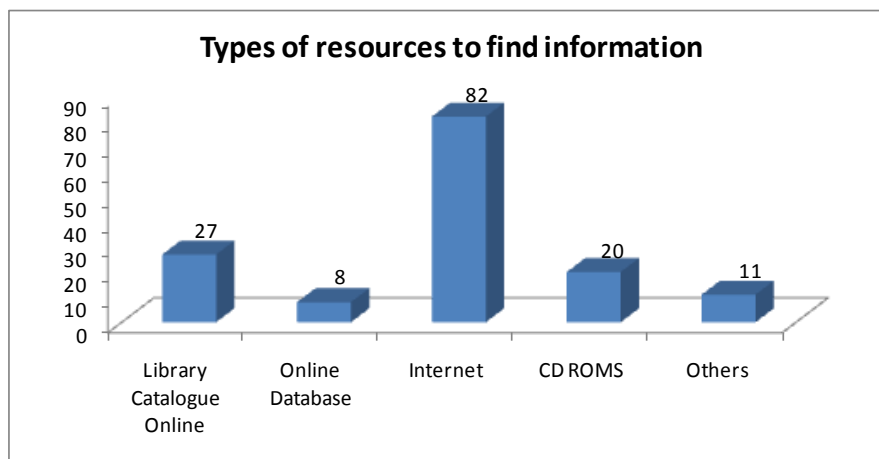
variables were significant which indicates rejection of the null hypothesis: where the p-value is less than  $\alpha$ ; 0.05. Therefore, it is concluded that there were significant differences between the variables as follows:

1. There was a significant difference in searching for Science and Technology information between primary school children in Malaysia and Australia.
2. There was a significant difference in searching for Language information between primary school children in Malaysia and Australia.
3. There was a significant difference in searching for other types of information between primary school children in Malaysia and Australia.

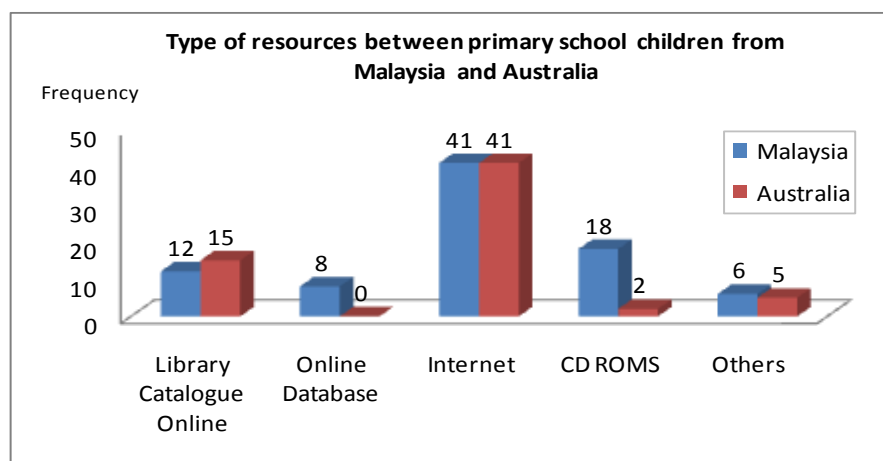
It is also noted that there were no significant differences in searching for Mathematics and Music types of information between the primary school children in Malaysia and Australia.

### 5.3.3 Type of Resources

As shown in Figure 5.7 and Table 5.3, the Internet is the most popular resource among primary school children from both countries, using their school's network, with a total of 82 school children (66.67%) reporting that they used this resource. Others resources that the school children used within the school network were online library catalogues (21.95%), followed by CD-ROMS (16.26%), other resources (8.94%) and online databases (6.50%). The total distribution between two countries is shown in Figure 5.8.



**Figure 5.7: Type of resources to find information**



**Figure 5.8: Type of resources between primary school children from Malaysia and Australia**

### 5.3.4 Assistance in Finding Information on the Internet

In response to the question about who assists them in finding information from the Internet, based on a ranking of 1 to 6 choices, 24 of school children (35.82%) from Malaysia indicated that their parents assisted them when using the Internet. This was followed by 14 (20.9%) who said their teachers helped them, 13 (19.4%) who did it on their own and ten school children (14.93%) who asked their friends for help. In Australia, 25 school children (44.64%) reported getting assistance from their teachers, followed by 16 (28.57%) who “just did it themselves” and

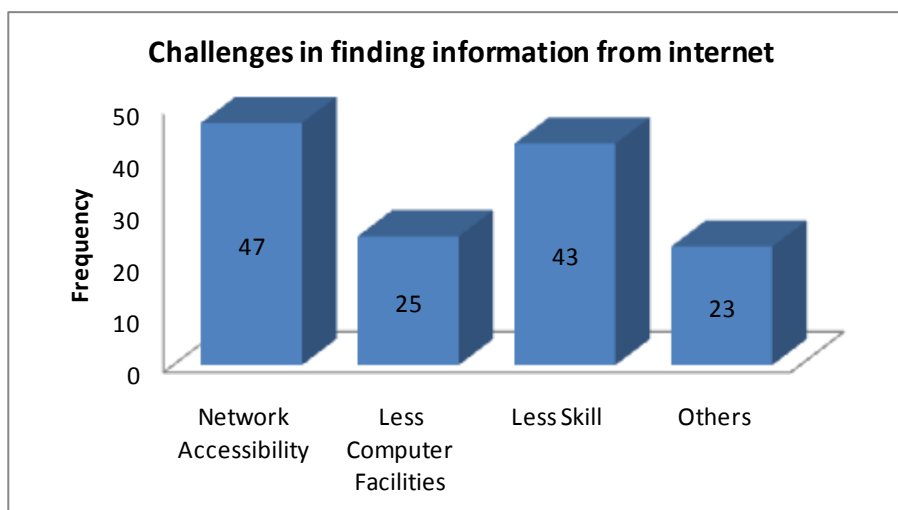
seven school children (12.5%) who said assistance came from their parents. School children from both countries claimed that they received little assistance from their teacher-librarian. Overall, teachers were ranked first in relation to the provision of assistance to find information on the Internet, followed by parents, students on their own, and assistance from friends as shown in Table 5.8.

	Frequency						Total frequency	Sum rank
	1st rank	2nd rank	3rd rank	4th rank	5th rank	6th rank		
Teacher	39	33	25	14	10	2	123	298
Teacher-Librarian	1	11	16	20	57	18	123	544
Parents	31	27	24	25	14	2	123	339
Friends	13	30	31	34	13	2	123	379
Myself	29	19	24	22	23	6	123	378
Others	10	3	3	8	6	93	123	645

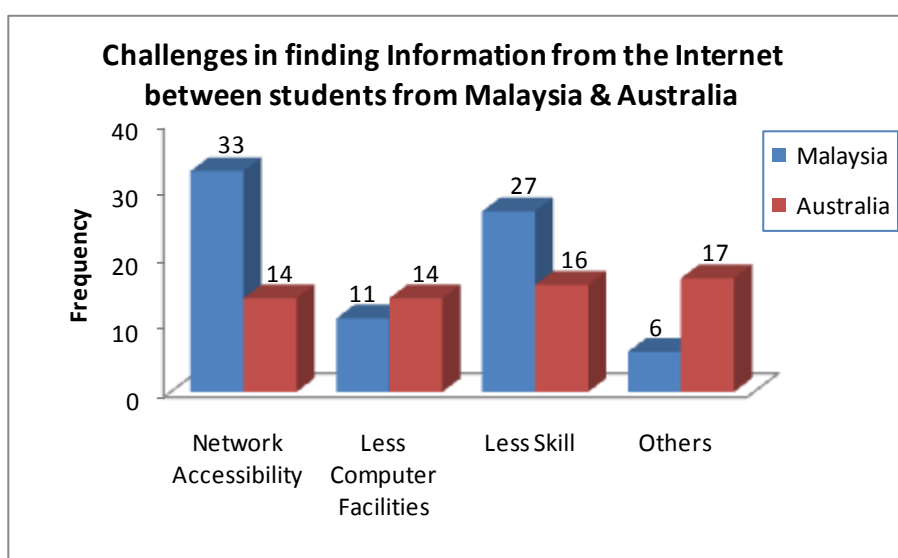
**Table 5.8: Ranking of sources for assistance to primary school children from Malaysia and Australia in finding information on the Internet**

### 5.3.5 Challenges in Finding Information on the Internet

As shown in Figure 5.9, the two main challenges faced by the students when finding information on the Internet were network inaccessibility and their lack of skill. The total distribution between the Malaysian and Australian students is shown in Figure 5.10.



**Figure 5.9: Challenges in finding information on the Internet**



**Figure 5.10: Challenges in finding information from Internet between primary school children from Malaysia and Australia**

With reference to the challenges of using the Internet faced by Malaysian and Australian students, 33 school children (49.25%) from Malaysia claimed that the biggest challenge they faced was network accessibility, followed by 27 (40.3%) who said that they lacked Internet skills. Meanwhile, in Australia, 17 school children (30.36%) claimed that their main challenges were their inability to get the necessary (or accurate) information and that the obtained text, such as the

reading material, was usually too complex for their comprehension. Other challenges that they faced were the lack of skills, and also when the school encountered network inaccessibility. Further analysis was carried out to test the differences in the variables between Malaysia and Australia. Table 5.9 shows the ranks for each sample in accordance with its respective variable. Table 5.10 shows the results of the Mann-Whitney U test.

<b>Ranks</b>				
<b>Variable</b>	<b>Origin</b>	<b>Total observations</b>	<b>Mean rank</b>	<b>Sum of ranks</b>
Network Accessibility	Malaysia	67	55.21	3699.00
	Australia	56	70.13	3927.0
	<b>Total</b>	<b>123</b>		
Less computer facilities	Malaysia	67	64.40	4315.00
	Australia	56	59.13	3311.00
	<b>Total</b>	<b>123</b>		
Less Internet skill	Malaysia	67	58.72	3934.00
	Australia	56	65.93	3692.00
	<b>Total</b>	<b>123</b>		
Others	Malaysia	67	67.99	4555.50
	Australia	56	54.83	3070.50
	<b>Total</b>	<b>123</b>		

**Table 5.9: Ranks for each sample in accordance with its respective variable (challenges)**

<b>Variables</b>	<b>Wilcoxon W</b>	<b>Z</b>	<b>p-value</b>
Network Accessibility	3699.00	-2.746	0.006
Less computer facilities	3311.00	-1.173	0.241
Less Internet skill	3934.00	-1.353	0.176
Others (i.e. language, spelling, reading)	3070.50	-3.019	0.003

**Table 5.10: Results for non-parametric analysis using the Mann-Whiney U test (challenges)**

From the Mann-Whitney U test (Table 5.10), two variables were significant which indicates rejection of the null hypothesis: where the p-value is less than  $\alpha$ ; 0.05. Therefore, it is concluded that there were significant differences between the variables as follows:

- There was a significant difference in the network accessibility, as a challenge in finding information from the Internet between primary school children in Malaysia and Australia.
- There was a significant difference in “other” challenges in finding information from the Internet between primary school children in Malaysia and Australia.

It is also noted that there was no significant difference in “less computer facilities” and “less Internet skill” as challenges in finding information from the Internet between the primary school children in Malaysia and Australia.

### 5.3.6 Favourite Search Engine

School children were asked to nominate their favourite search engine, with the majority of Malaysian school children reporting that they used Yahoo followed by Google and the Australian school children saying they preferred Google followed by Yahoo (as shown in Table 5.11). This shows that these were the two search engines most commonly used by the school children within their school networks. Other online search resources used were Wikipedia, Answers and SafeSearch.

<b>Favourite Search Engine</b>	<b>Malaysia</b>	<b>Australia</b>
First	Yahoo	Google
Second	Google	Yahoo

**Table 5.11: Favourite search engine**

## 5.4 Section C - Information-Seeking Process

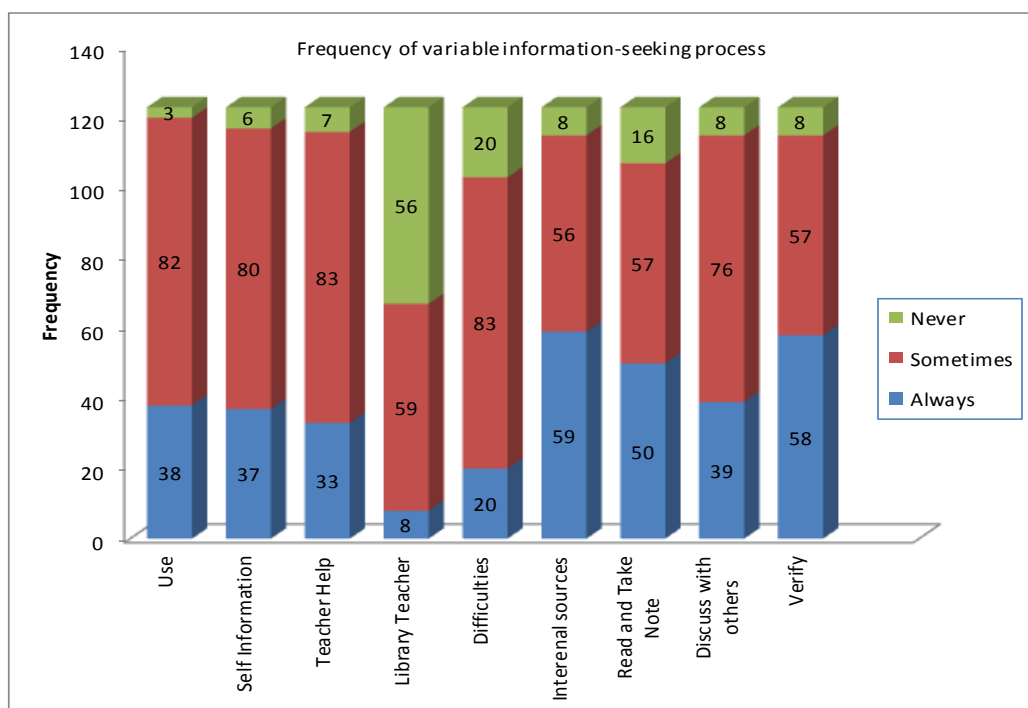
Table 5.12 presents the combined results of the frequency of undertaking information-seeking by the school children in Malaysia and Australia. The answers were given using Likert-type response scales where 1=always, 2=sometimes and 3=never. The standard deviation (sd), give an indication of the average distance from the mean, with low sd indicating most of the answers were clustered around the mean (low variation). At a glance, the means in Table 5.12 were almost all in favour of scales 1 and 2 with all having low sd (only 3 items on the scale). This shows that most of the answers given by the school children tended towards the *always* and *sometimes* options.

<b>Variable</b>	<b>Always (%)</b>	<b>Sometimes (%)</b>	<b>Never (%)</b>	<b>Mean</b>	<b>Std dev.</b>
Use more than one search engine	38 (30.9)	82 (66.7)	3 (2.4)	1.72	0.5044
Search by myself	37 (30.1)	80 (65.0)	6 (4.9)	1.75	0.5370
Get help from a teacher	33 (26.8)	83 (67.5)	7 (5.7)	1.79	0.5318
Need the teacher-librarian to assist	8 (6.5)	59 (48.0)	56 (45.5)	2.39	0.6091
Difficulty finding information	20 (16.3)	83 (76.5)	20 (16.3)	2.00	0.5726
Use Internet environment	59 (48.0)	56 (45.5)	8 (6.5)	1.59	0.6131
Read and take notes on ideas	50 (40.7)	57 (46.3)	16 (13.0)	1.72	0.6811
Discuss with others	39 (31.7)	76 (61.8)	8 (6.5)	1.75	0.5667
Re-check and verify the information	58 (47.2)	57 (46.3)	8 (6.5)	1.59	0.6119

**Table 5.12: Frequency of variable information-seeking for academic purpose of school children in Malaysia and Australia**



As shown in Figure 5.11, the majority of the school children (66.7%) admitted they sometimes switched or changed from one search engine to another (that is, between *Google* and *Yahoo*). About 37 (30%) of the school children did the searching by themselves, and about two-thirds of the respondents did not. Although the majority only “sometimes” did it by themselves, they rarely received assistance from teachers or teacher-librarians. These are important findings which will be discussed in detail in Chapter 8. About 67.5% of these school children claimed that they sometimes received help from their teachers, and 45.5% of them stated that they did not need assistance from the teacher-librarians. The survey also revealed that out of 123 school children, 103 admitted they sometimes or never had difficulty in searching for information for their academic needs.



**Figure 5.11: Frequency of variable in the information-seeking process**

In relation to the frequency of use of the Web environment to seek information, fifty-six of the school children (45.5%) selected *sometimes* and eight school children said *never*, and these two groups contributed about 52% of the total observations in the survey. This could be due to the fact that the school children's

activities were generally attached to their class assignments which were based around resources provided by the school. This is discussed further in Chapter 8.

It is found that about 40% of the school children always read information and made notes of what they found in their searches. This may include ideas or hints related to their class assignments. However, it appears they might not be interested in sharing the ideas or hints found with their friends or teachers. About 62% claimed they *sometimes* engaged in discussion with others based on the ideas they found. This figure was double the number who claimed *always*. It is interesting to learn that the school children were cautious about information they found on the Internet. Only about 7% of them admitted that they *never* had the intention to re-check the information found on the Internet prior to making a final decision in using the information for academic purposes. This is a good indication that school children may be aware of the need to check the validity of the information gained rather than using it straight away for their class assignments.

## **5.5 Reliability Analysis**

Reliability is concerned with the accuracy (consistency, stability and repeatability) of a measure in representing the true score of the subject being assessed on a particular dimension. In this research, Cronbach's alpha was used to test the reliability of the study. However, the majority of the Cronbach alpha figures for this study were slightly lower than those of normative samples. According to Burns and Grove (2001), every measure has a small amount of systematic error. This could account for the slightly lower Cronbach alpha figures. This further justifies the use of mixed methods in this research; mixed methods were used to protect against systematic error.

## **5.6 Non-Parametric Analysis**

Most statisticians reject the notion that parametric tests require interval data and thus ordinal data needs to be analysed with non-parametric methods (Gaito,

1980). There are, however, other factors that could lead to the preference for non-parametric analysis with certain types of ordinal data. Likert scale data, for example, typically violates the normality assumption and also often violates the “homogeneity of variance assumption” made when conducting traditional parametric analysis. Assumptions for parametric procedures are not met, especially for the Likert scale data; thus, for this study, the Mann-Whitney U test was used to test the differences among the two populations of school children in Malaysia and Australia. Nanna and Sawilowsky (1998) demonstrated that with typical Likert scale data, the Mann-Whitney U test has a considerable power advantage over the parametric  $t$  test.

Non-parametric analysis was carried out in this study mainly for the purpose of further investigation by breaking down the population into the two groups of school children, in Malaysia and Australia. A simple reason for this is that sometimes a single population mean (in this case, the means as given in Table 5.13 for each test variable) may be deceptive because it is heavily influenced by some underlying variables. It is understood that the school systems, environments, rules and so forth are different between Malaysia and Australia. With respect to this, further analysis was done of the Likert scale data to test the observations under the assumption that they come from two independent populations. The null hypothesis is that they come from one population, that is, that population 1 (Malaysia) is no different from population 2 (Australia), against the alternative hypothesis that they are different. The findings of the analysis are explained as follows.

Unlike the  $t$  test and other parametric tests, non-parametric test is based only on the ranks of the original values. Each variable tested was listed in the *variable* column in Table 5.12. Each case is ranked without regard to group membership where ties take the average rank for the tied values. Then, the cases are ranked in ascending order. After ranking, the ranks are summed within groups. Except for the test variable *read and take notes on ideas*, the mean ranks for the rest of the variables indicate that the Malaysian group has a lower mean rank, an indication of giving lower scale responses (tendency to give more *always responses*) as

## Primary School Children's Information-Seeking Process: Students' Perspectives

compared to the Australian group. By looking at the mean ranks of *read and take notes on ideas*, it indicates that the Malaysian group had the tendency of *rarely* (or *never*) reading or taking notes on the ideas they obtained from the websites they browsed. This is another important finding that will be discussed in Chapter 8.

Furthermore, the average ranks between these two groups are over 10 points apart but the rest are all less than 8 points apart (except for the variable *difficulty in finding info*). If these two groups are randomly different, the mean ranks should not be very different from one another.

Ranks				
Variable	Origin	Total Observations	Mean Rank	Sum of Ranks
Use more than one search engine	Malaysia	67	60.81	4074.00
	Australia	56	63.43	3552.00
	<b>Total</b>	<b>123</b>		
Search by myself	Malaysia	67	60.68	4065.50
	Australia	56	63.58	3560.50
	<b>Total</b>	<b>123</b>		
Get help from a teacher	Malaysia	67	60.37	4045.00
	Australia	56	63.95	3581.00
	<b>Total</b>	<b>123</b>		
Need the teacher-librarian to assist	Malaysia	67	58.31	3907.00
	Australia	56	66.41	3719.00
	<b>Total</b>	<b>123</b>		
Difficulty finding information	Malaysia	67	55.08	3690.50
	Australia	56	70.28	3935.50
	<b>Total</b>	<b>123</b>		
Use the Web environment	Malaysia	67	58.51	3920.50
	Australia	56	66.17	3705.50
	<b>Total</b>	<b>123</b>		
Read and take notes on ideas	Malaysia	67	67.13	4498.00
	Australia	56	55.86	3128.00
	<b>Total</b>	<b>123</b>		

Ranks				
Discuss with others	Malaysia	67	58.16	3896.50
	Australia	56	66.60	3729.50
	<b>Total</b>	<b>123</b>		
Re-check and verify the info	Malaysia	67	60.25	4036.50
	Australia	56	64.10	3589.50
	<b>Total</b>	<b>123</b>		

**Table 5.13: Ranks for each sample in accordance with its respective variable**

Table 5.14 exhibits the results of the Mann-Whitney U test with the null hypothesis that two independent samples come from the same population. The statistic shows that only two variables were significant which is indicative of rejecting the null hypothesis. The statistic is simply the smaller of the two mean ranks shown for each group in the rank in Table 5.14. The value displayed for the first variable, for example, is for the Malaysian group (since it has the lower mean rank). From Table 5.13, it is clearly shown that all the W statistics refer to the Malaysian group except for the variable “read and take notes on ideas”.

The advantage of using the Mann-Whitney U tests is that one can always find an approximation to normal distribution as the sample size grows. In SPSS, the test includes the approximation using the Z statistic as the sample size grows beyond 10 in either group. The negative Z statistics indicate that the rank sums are lower than their expected values. From the p-values displayed in Table 5.14, it can be concluded that:

1. There were no significant differences between all variables except for “difficulty finding information” and “read and take notes on ideas”.
2. For the “difficulty finding information” variable, the significance ( $p = 0.0044$ ) indicates significant difference in school children's difficulty in finding information for their class assignments, between the Malaysian and Australian groups. It appears that the Malaysian group had difficulty more often.

3. For the “read and take notes on ideas” variable, even though the significance value is borderline it is still acceptable. This indicates that the Australian school children were more likely to read and take notes on ideas that they gained from their Internet activities.

Variable	Wilcoxon W	Z	p-value
Use more than one search engine	4074	-0.494799	0.6207
Search by myself	4065.5	-0.538143	0.5905
Get help from a teacher	4045	-0.674648	0.4999
Need the librarian to assist	3907	-1.406863	0.1595
Difficulty finding information	3690.5	-2.84586	0.0044
Use Web environment	3920.5	-1.329969	0.1835
Read and take notes on ideas	3128	-1.916303	0.0553
Discuss with others	3896.5	-1.528519	0.1264
Recheck and verify the information	4036.5	-0.6691	0.5034

**Table 5.14: Results for non-parametric analysis using the Mann-Whitney U test**

## 5.7 Summary

This chapter presented a descriptive analysis of the primary school children's responses to the questionnaire. The findings were presented in three main sections: first, a profile of the school children involved in the research; second, information on the children's knowledge, usage and the challenges of using the Internet in a school environment; and third, the school children's level of agreement with statements covering several aspects of the information-seeking process for academic purposes. The results of the analysis show that children from both countries have positive attitudes towards information-seeking processes from the Internet in a school setting. They responded that the Internet was the main resource used for the purpose of completing assignments given by the teachers, especially for the subjects Language and Science and Technology. Children claim they get assistance from teachers, parents and friends in order to complete their assignments from the Internet. Other findings from the survey are that:

- The main challenge for the Malaysia children was network accessibility, and for the Australia children it was less skills in using the Internet
- “Difficulty finding information” as an information-seeking processes variable was more frequent for the Malaysian group than the Australian children
- In relation to the “read and take notes on ideas” information-seeking processes variable, the Australian school children were more likely to read and take notes on ideas that they gained from the Internet activities than Malaysian school children.

Having presented the findings from the quantitative data, the next chapter discusses the qualitative data derived from observations and interviews.

## **6 Observation of Primary School Children's Information-Seeking**

### **6.1 Introduction**

This chapter presents observations of school children that form part of the qualitative results in this research. The results are discussed in relation to the two case studies that were carried out to investigate primary school children's information-seeking processes using the Internet for academic purposes. The Case Australia and Case Malaysia studies are representative of government-funded schools in Australia and Malaysia. First, the results are presented for each country separately. This is followed by a summary of the data which provide comparisons between the two cases. Each case study is presented according to the following themes derived from Kuhlthau's model (1993): initiation, selection, exploration, formulation, collection and presentation. The "think aloud" protocol was used while the school children participating in the study were asked to use information on the Internet to find answers. However, some of the students were reluctant to verbally report the feelings they were experiencing when seeking information from the Internet. This could be seen as a limitation of the study but one that is understandable considering the age of the children and possibly exacerbated by the fact that the children did not know the person who was observing their information seeking and asking them to "think aloud". The study involved observations of children as they sought information from the Internet and used navigational skills. The children were asked to perform one information-seeking task in the 20-minute session. During the observation/think aloud sessions, I used the formal note-taking technique to record any actions and activities that I observed.

The checklist was based on Kuhlthau's model of six stages and the note taking served as an aide memoire for extensive detail from the observations. The



questions were given to the children in print form. Three tasks were set by Malaysian teachers and agreed to by Victorian teachers, with some changes made to task 3 in order to suit the primary school children in Victoria. Both ill-defined tasks and well-defined tasks were included. answering the well-defined task, which was Task 1 regarding pollution, compared to Task 2 (Transportation) and Task 3 (Interesting places) which were considered to be ill-defined tasks. The students were to find information on specific topics based on their learning. The tasks are set out in detail in Table 6.1.

<b>TASK</b>	<b>TOPIC</b>	<b>QUESTIONS</b>
1	Pollution (Well-defined)	a. What is pollution? b. List types of pollution. c. List out the causes, effect and solutions for water pollution.
2	Transport (Ill-defined)	a. List three (3) modes of transport. b. Give examples of each mode of transport. c. Give examples of the early forms of transport.
3	Interesting places (Ill-defined)	a. List three states in Malaysia/Australia. b. For each state, find interesting places to visit.

**Table 6.1 Tasks given by teachers**

At the end of the search process for this assignment the students were required to create a report based on the information they found from their Internet seeking, including other information they had learnt in class. The final report or answers could be presented in any form including pictures, charts, maps, text and other visual representations. However, for these sessions, the teachers from Malaysia and Australia did not evaluate or grade the students on the reports. This was because the purpose of these sessions was only to support the teaching and learning of the main subject.

## **6.2 Case Profile – Australia**

In the first case study, two schools in Australia were investigated. The characteristics of each school are presented in Table 6.2. As this study is comparative in nature, involving two countries, both Australian schools – AUS1

and AUS2 – are regarded as one case study. Both schools are from the same Victorian government education system and, as such, the data from both schools, with participants from Year 4 to Year 6, are analysed together. This enables a richer case study to be used as two similar but different schools in Victoria form a more comprehensive data set.

<b>Case</b>	<b>Country</b>	<b>School code</b>	<b>School type/sector</b>	<b>Year range</b>	<b>Total enrolment</b>	<b>Cultural background</b>	<b>Language background other than English</b>	<b>Indigenous students</b>	<b>Computer facilities</b>	<b>Teachers</b>	<b>Location</b>
A		AUS1	Primary, Government	Prep-Year 6	312	Middle Eastern, African, Somalia, Chinese and Vietnamese	58%	9%	4 PCs in each classroom 15 PCs in computer lab	23	Metropolitan
	Australia	AUS2	Primary, Government	Prep-Year 6	135	Middle Eastern, African, Indian, Chinese and Vietnamese	50%	7%	8 PCs in one classroom 25 PCs in computer lab	12	Metropolitan

**Table 6.2: Details of two schools in Australian case study**

The first Australian school (AUS1) was established in 1957 and is located in the northern metropolitan area of Melbourne, Victoria. In 2010, the school had 23 teachers and 312 students, ranging from Prep (i.e. pre-Year 1) to Year 6. The students are from varied cultural backgrounds such as Middle Eastern, African, Somali, Chinese, Vietnamese, and Indigenous and this contributes to the school profile of 58% of students having a different language background other than English. As more than half of the students had a language background other than English it may have contributed to the lack of English proficiency among Australian students for this study. The school's goal is to optimise learning outcomes and develop the personal growth of the students. ICT is actively used across all subject areas in the school. In Prep to Year Four classes, throughout the day, students use several desktop computers for a wide range of tasks such as research, skill development and preparing presentations of discovered information. There are about 15 computers in the computer lab and four computers in each classroom.

The school has a well-equipped ICT Centre. Each class has one ICT session per week with an ICT specialist teacher. The students use the computers to create, communicate and visualise as part of their learning process. Students also have regular sessions in the ICT Centre with their classroom teachers, whenever it is necessary. These sessions focus on skill developments such as reading and mathematics, and the students can also use Microsoft Office to publish their work or for preparing presentations for subjects such as Science or Inquiry Units. The school principal and the assistant principal manage the resources and software that need to be updated from the Internet with the help of the ICT teacher. An ICT technician comes on a weekly basis, as a resource provided by the Department of Education, Victoria.

The second Australian school (AUS2) is a school of 135 students from a wide variety of cultural backgrounds, also of Middle Eastern, African, Vietnamese, Chinese, Indian descent and, Indigenous. The school prides itself on its ability to cater for a wide range of abilities and backgrounds. The school's motto is

“learning for life”. As many of the primary school children are from a variety of non-English speaking backgrounds, students have the opportunity to develop an understanding of other cultures. About 50% of students come from a background of language other than English.

AUS2 school has seven classrooms ranging from Prep to Year 6, an art room, a library/information resource centre, a computer lab and a multi-purpose hall. There are about 25 computers in the computer lab and eight computers in the access room located in one of the classrooms. The school provides programs across the full range of the Victorian Essential Learning Standards (VELS) domains through an integrated curriculum approach. The school has a particular emphasis on incorporating learning technologies across the curriculum, and on improving literacy standards in the school. There is an ICT Committee which selects the sources and software to be updated for teaching and learning purposes. The committee includes the principal, the ICT teacher and the part-time ICT technician.

### **6.3 Case Australia**

The Case Australia findings were derived from the observations of a group of Victorian primary school children's information seeking using the Internet for academic purposes. Their search processes were captured through one-to-one observation. For these observation sessions, the population was reduced from 56 to 27 students who ranged in age from 10 to 12 years. The selection of these students was made by the classroom teachers and due to time constraints 27 of the possible 56 students were observed. This age group was chosen in order to be compatible with Malaysian primary school children who typically start using the Internet in the school setting between the ages of 10 and 12 (Year 4 to Year 6). The details of the Case Australia group of children are set out in Table 6.3.

<b>Student ID</b>	<b>Age</b>	<b>Year</b>	<b>Gender</b>	<b>Task</b>	<b>Duration</b>
AUS1	10	3/4	Female	2	9min
AUS2	10	3/4	Male	2	12min
AUS3	12	5/6	Male	1	6min
AUS4	10	3/4	Male	2	8min
AUS5	10	3/4	Male	2	12min
AUS6	10	3/4	Female	2	11min
AUS7	10	3/4	Female	2	8min
AUS8	12	5/6	Male	1	5min
AUS9	12	5/6	Male	1	4min
AUS10	11	5/6	Male	1	5min
AUS11	11	5/6	Female	2	18min
AUS12	12	5/6	Male	1	12min
AUS13	12	5/6	Female	1	10min
AUS14	11	5/6	Female	1	13min
AUS15	11	5/6	Female	1	17min
AUS16	10	3/4	Male	2	13min
AUS17	10	3/4	Male	2	12min
AUS18	10	3/4	Male	2	8min
AUS19	10	3/4	Male	2	12min
AUS20	10	3/4	Female	2	8min
AUS21	10	3/4	Female	2	15min
AUS22	11	5/6	Female	3	9min
AUS23	11	5/6	Female	3	19min
AUS24	11	5/6	Female	3	12min
AUS25	11	5/6	Female	3	9min
AUS26	11	5/6	Female	3	18min
AUS27	11	5/6	Male	3	13min

Note: The bolded cases are highlighted as examples detailed in the following sub-section.

**Table 6.3: School children's ID, age, grade, gender, task and time taken – Case Australia**

The primary school children were assigned a task based on the current level of their education. To ensure the appropriate level of task was chosen, classroom teachers chose the assignment topics. The tasks were also chosen to reflect relevancy to the curricula in Malaysia and Australia respectively. The profiles of particular students' search sessions are set out in the following sub-sections in order to provide detailed descriptions of the information-seeking processes carried out by primary school children aged 10 to 12 years old when using the Internet. For descriptive purposes, 10 examples of individual school children are discussed to demonstrate the different patterns of information-seeking processes among them. The coding schema was based on student identification characteristics as shown in Table 6.3 above.

### 6.3.1 AUS1

AUS1, a female student from Year 3/4 was given task 2, which was considered to be a loosely-defined task. When I asked her if she understood the task, she replied "yes" and identified that the topic area was about transportation (knowledge domain). She looked calm (feelings), and typed "transport" (key term used) as her initial search query by using Google as a search engine. From the search results, she chose the first result which was from "[en.wikipedia.org/wiki/Transport](http://en.wikipedia.org/wiki/Transport)" (websites visited) and clicked on that link, as shown in the screenshot in Figure 6.1. After clicking on the Wikipedia link, she said "This is the answer; it is easy, everything is here, just copy and paste it in a Word document". For the second question, she used the back button to refine the search term and she typed "history of transport". From the search results listed she clicked the seventh answer from [www.localhistories.org/18thcent.html](http://www.localhistories.org/18thcent.html) site as shown in the screenshot in Figure 6.2. This site is about life in England in the 1700s. It shows a list of history in England including the history of transportation. AUS1 then scrolled down and clicked on the history of transportation (<http://www.localhistories.org/transport.html>). She followed the link and for the answer to this question she just clicked on the picture and copied it into a Word document. She also copied the text available on the site explaining the history of

## Observation of Primary School Children's Information-Seeking

transportation, saved her work and said, "I'm done". The duration of time for answering these two questions was 9 minutes. Figure 6.3 shows her result.

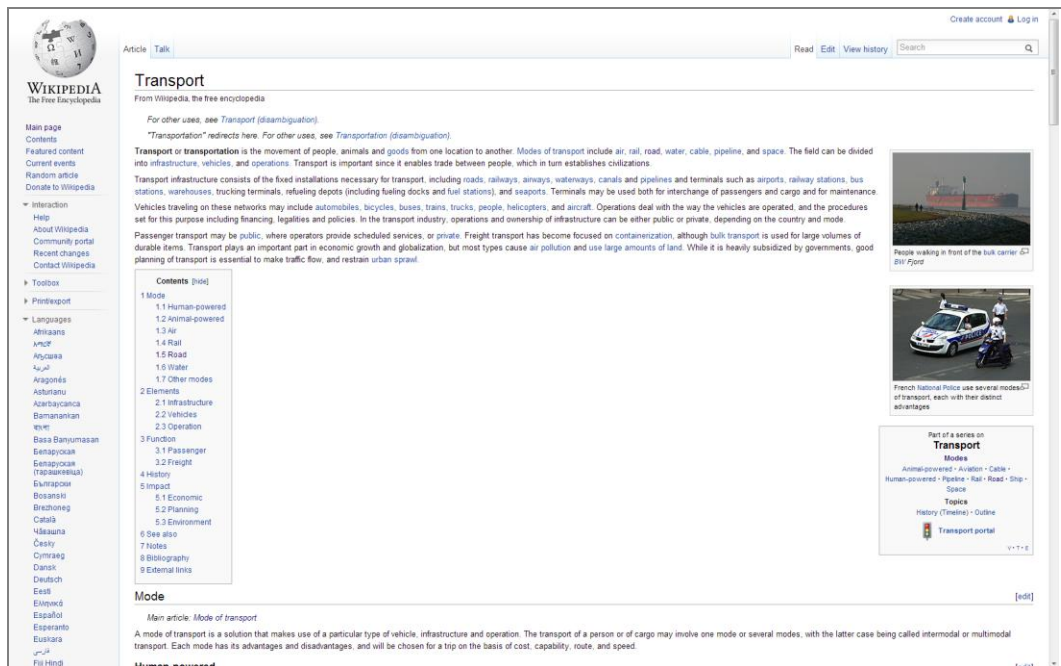


Figure 6.1: Site used for answering first question (AUS1)

([http://en.wikipedia.org/wiki/Main\\_Page](http://en.wikipedia.org/wiki/Main_Page))

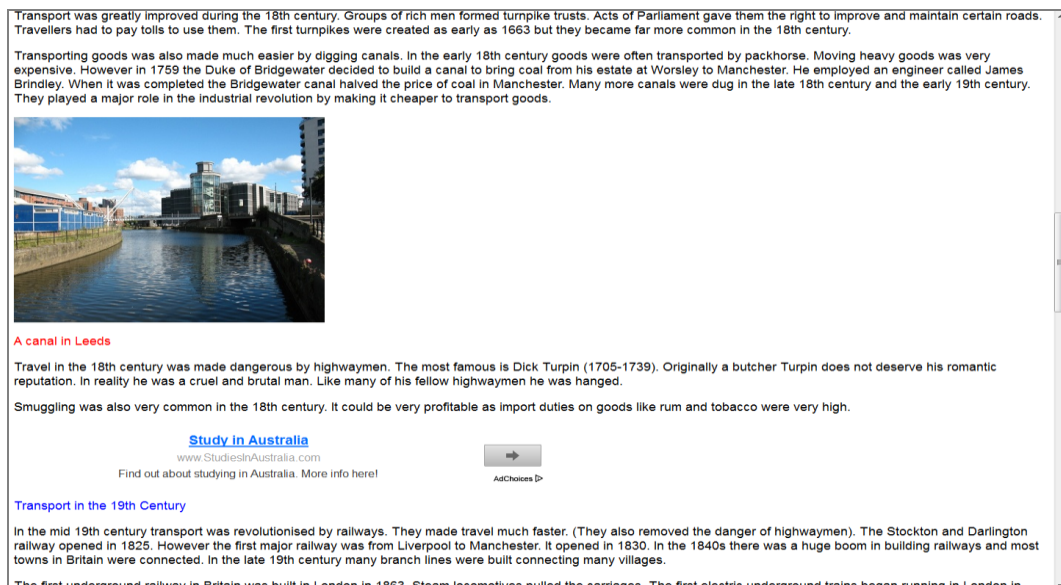


Figure 6.2: Site used for answering second question (AUS1)

(<http://www.localhistories.org/transport.html>)



### AUS1

**Transport** or **transportation** is the movement of people, animals and [goods](#) from one location to another. [Modes of transport](#) include [air](#), [rail](#), [road](#), [water](#), [cable](#), [pipeline](#), and [space](#). The field can be divided into [infrastructure](#), [vehicles](#), and [operations](#). Transport is important since it enables trade between people, which in turn establishes civilizations.



Transporting goods was also made much easier by digging canals. In the early 18th century goods were often transported by packhorse. Moving heavy goods was very expensive. However in 1759 the Duke of Bridgewater decided to build a canal to bring coal from his estate at Worsley to Manchester. He employed an engineer called James Brindley. When it was completed the Bridgewater canal halved the price of coal in Manchester. Many more canals were dug in the late 18th century and the early 19th century. They played a major role in the industrial revolution by making it cheaper to transport goods.

**Figure 6.3: Completed task by AUS1 saved in Word document**

### 6.3.2 AUS2

AUS2 was given task 2 on the topic of transport and mistakenly identified it as the topic of Mathematics. He confidently said, “Yes, I do understand the questions”. When he started browsing, he looked nervous (feelings), chose Bing.com as his

search engine and typed “what kind of transport” (key term used). From the search results listed, he clicked on the first result, which was from the <http://library.thinkquest.org/J0112389/transportation.htm> site (websites visited) (Figure 6.4). Without reading the text on the screen in detail, he directly copied the meaning of transportation and pasted it into a Word document. On this site, there was a menu button on the top which he clicked. He said, “This is not a nice picture and there is not a lot of information that I want”. He then asked me, “Can I go to images?”, and used the back button to go back to the Bing site. From there, he clicked on the images button without refining the search terms. After he clicked on it, he claimed, “This is also not a nice picture and not related to what I want.” Then he refined the search terms and typed the word “trans” using incorrect spelling for “train”. The images that came up surprised him and he said to me, “I’m actually looking for train not this picture [car]”. He added, “Should be okay, car also another type of transportation”. Then he copied the car image and pasted it in the Word document. He added to the picture, and told me, “look, this car with no number car [i.e. plate], I should type this, so people can understand on my view about this car is”. After doing that, he asked me how to spell “train”; I helped him and he went through the same process. He chose the list of pictures of trains from the images and copied and pasted it alongside the train picture. He made a comment, saying, “This is new trains”. His completed task is shown below in Figure 6.5. AUS2 finished doing his task in 12 minutes.

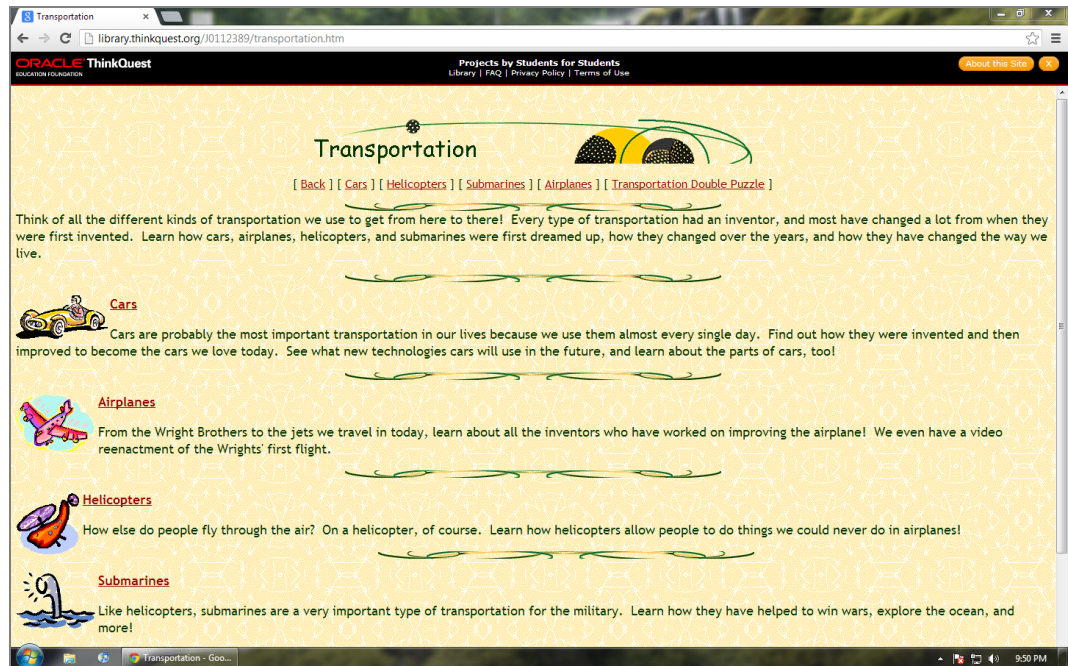


Figure 6.4: Site for answering first and second questions (AUS2)

(<http://library.thinkquest.org/J0112389/transportation.htm>)

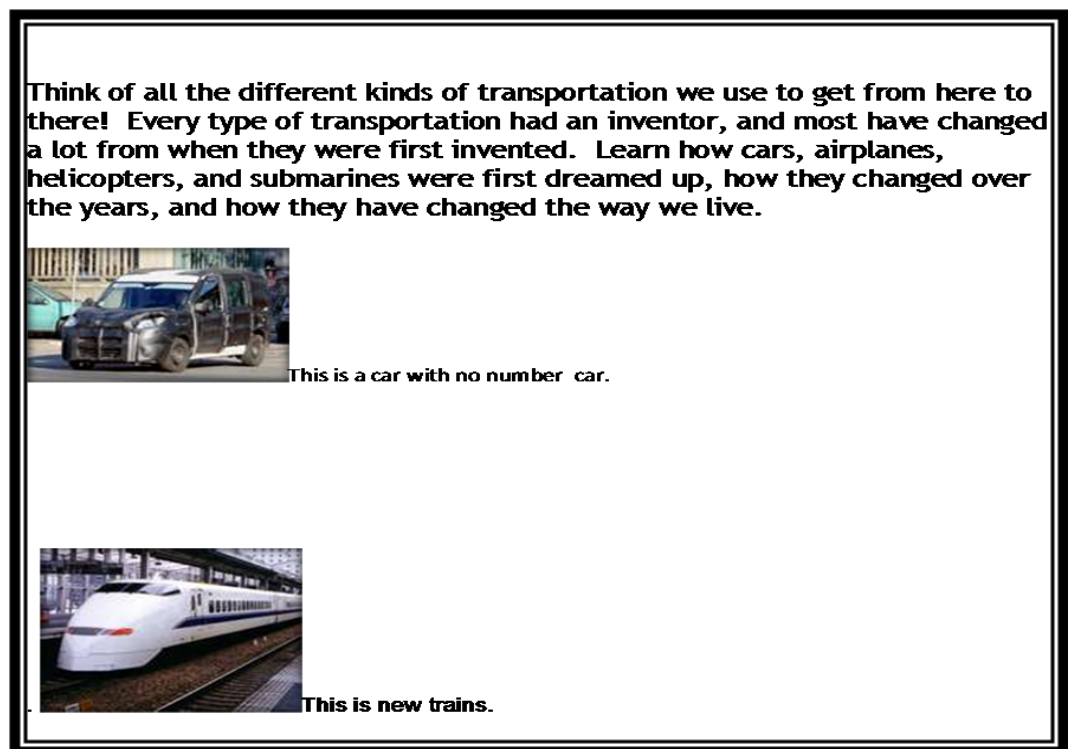
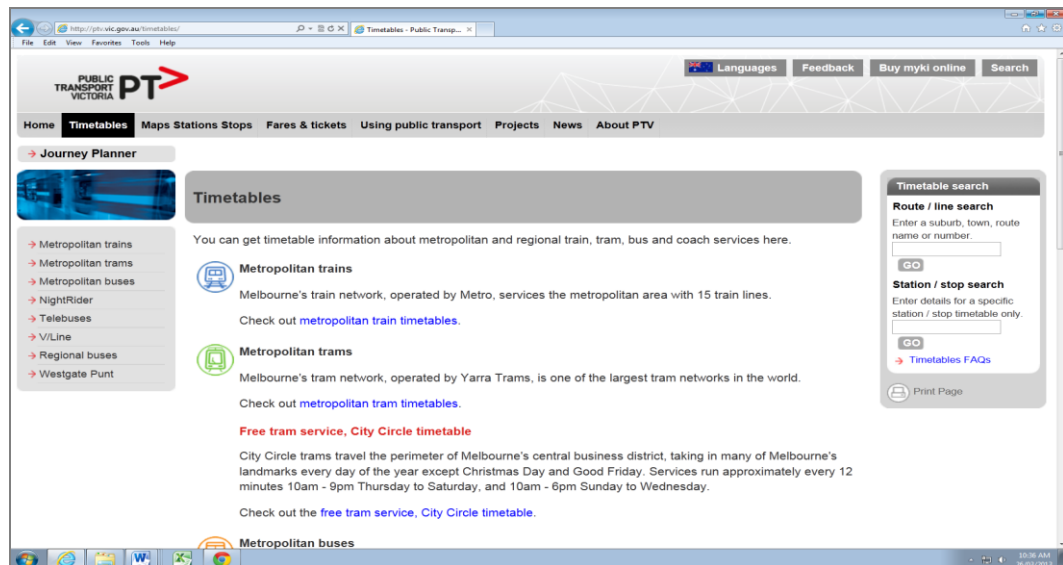


Figure 6.5: Completed task by AUS2 saved in Word document

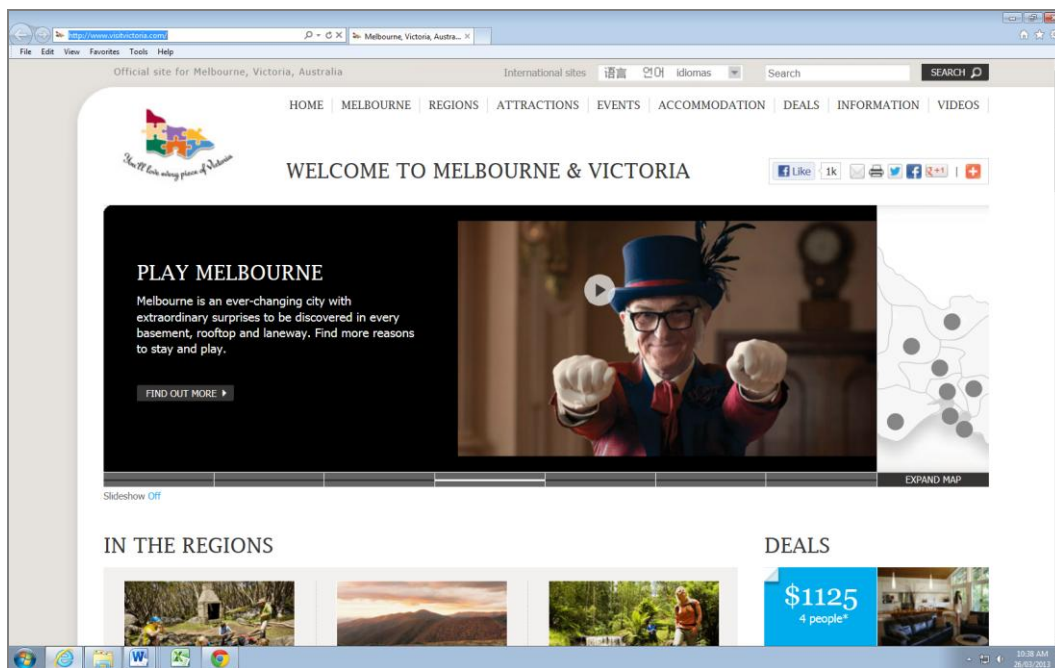
## 6.3.3 AUS18

AUS18, a male student aged 10, said that he did not understand the requirements for task 2 and he asked me for an explanation. I explained the task and then he began his search at Google.com and typed, “transport information in Melbourne” (key term used) in the search box. On the search list, he chose and clicked the first result which was at [www.metlinkmelbourne.com.au/](http://www.metlinkmelbourne.com.au/) (Figure 6.6) (website used). He said, “I could not find anything from this site” and clicked on the back button to select another option from the search results. He then clicked the sixth option which was from <http://www.visitvictoria.com/> (Figure 6.7). He then opened Microsoft Word and simply typed “buses” (key term used), even though there was no information about buses in the list of results. He made another attempt and scrolled to the bottom of the search list and said “nothing much from here”. Then, he went back to the Microsoft Word document and typed “trams, trains”. After he finished typing his answer in Word, he said, “Lucky I know the answer”. He answered the task based on his knowledge and not on finding the answer from selected sites. The answer given by AUS18 is shown in Figure 6.8. He finished his task in 8 minutes.



**Figure 6.6: Site for answering questions (AUS18)**

([www.metlinkmelbourne.com.au/](http://www.metlinkmelbourne.com.au/))



**Figure 6.7: Site for answering questions (AUS18)**

(<http://www.visitvictoria.com/>)

AUS18

Buses   trams   trains

You can catch greyhound and skybus.

trams

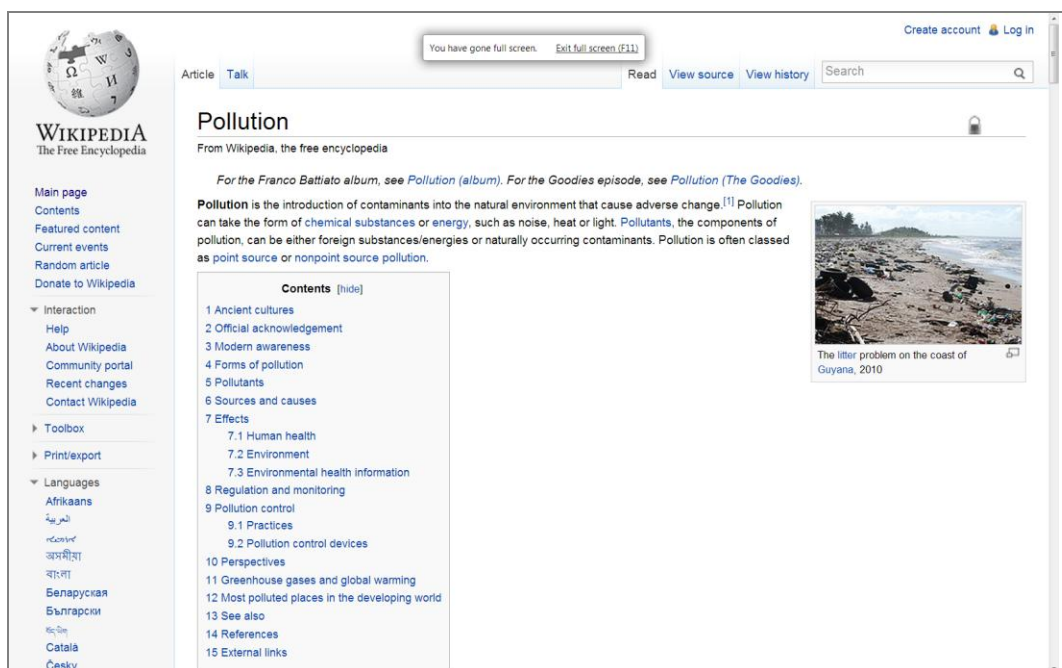
**Figure 6.8: Completed task by AUS18 saved in Word document**

### 6.3.4 AUS15

Student AUS15 read task 1 (pollution) and said, “This is all about integrated study” (knowledge domain). She began her search by using Google.com and typed “pollution” as her search term. She quickly chose the first result site of <http://en.wikipedia.org/wiki/Pollution> (Figure 6.9). After a while of scanning and scrolling the page, she said, “I have to open Word”. She returned to the Wikipedia site and said, “Normally I read through first, make sense and have some idea from reading then I write down my answers”. She focused on reading through to find information and she said “Wikipedia was difficult to read as the text is for college



or university students but I have to find the information here as most of the answer available in here. So I have to really understand it even this is more on adult stuff". Her strategy was to open Wikipedia and at the same time open Microsoft Windows in order for her to be able to read the information and at the same time write her answers in the Word document. After scrolling up and down, reading the Wikipedia page about pollution, she started writing and constructed her own sentences. Her answer is shown in Figure 6.10. There were some spelling errors such as noise, environment and haze. After 17 minutes, she confidently (feelings) said, "Finally, I manage to complete the task and I'm happy".



**Figure 6.9: Site for answering questions (AUS15)**

(<http://en.wikipedia.org/wiki/Pollution>)

AUS15

Pollution is when water gets very dirty and air get dirty.

Pollution can come in four different types 1 air pollution 2 water pollution 3 land pollution and noise pollution

Water pollution is when people throw rubbish on the ground that goes down the drain and its goes in to the water and some animals eat some of the rubbish and some animals dies from getting it stuck in there thought.

Many things contain pollution rubbish transport land and noise pollution they and part of heath too air pollution can come from cars and its going into the enivoment it can make the air hazey storm water that goes down your street when it is raining the water finds a big hole in the gutter called storm drains

**Figure 6.10: Completed task by AUS15 saved in Word document**

### **6.3.5 AUS12**

AUS12 understood the task and said it was about the environment. He said:

First of all go to Google.com (search engine used) and type pollution. Now you see it will appear like this and you have to choose one of the following search results. As for me, I would go to the second result from [http://winners.virtualclassroom.org/0518/Pollution/ground\\_pollution.html](http://winners.virtualclassroom.org/0518/Pollution/ground_pollution.html) and clicked it.

He then added, "I prefer to see diagram or picture as it is easy to understand". AUS12 read, and after a while he directly copied and pasted a definition of pollution. Next, he copied the picture and pasted it into the Word document. For the second question, he went back to Google.com and refined the search terms and typed "what causes of pollution". He clicked the third search result from <http://greenliving.nationalgeographic.com/global-warming/> and said, "Hmm ... too complex". He went back using the back button and refined the search term again. This time he typed "groud [ground] pollution" and a Google message appeared "Do you mean ground pollution?". It seemed he had a spelling problem but said "Lucky to have Google spelling checker". He clicked the first result, from

[http://winners.virtualclassroom.org/0518/Pollution/ground\\_pollution.html](http://winners.virtualclassroom.org/0518/Pollution/ground_pollution.html) (Figure 6.11). He said, “Well from this picture I do understand how it is caused”. He typed the answer based on the information and picture from the sites that he chose and also his own knowledge about pollution. The answer completed by AUS12 is shown in Figure 6.12. AUS12 completed the task in 12 minutes.



**Figure 6.11: Site for answering questions (AUS12)**

([http://winners.virtualclassroom.org/0518/Pollution/ground\\_pollution.html](http://winners.virtualclassroom.org/0518/Pollution/ground_pollution.html))



AUS12

Ground-water pollution, stratum contamination, and ground-air pollution are all types of ground pollution. It is the consequence of noxious industrial wastes being dumped. The ground is soaked with them, and contamination is accumulated little by little. As a result, plants begin to die. Then, creatures die too. If the ground is polluted, man will not be able to live either.



Pollution is caused by people throwing rubbish on the ground or dump trucks drop rubbish. The wind pushes the pollution into the gutters and then the rain slides it into the drain pipes and the pollution goes into creeks and ocean. Killing our marine life animals.

Figure 6.12: Completed task by AUS12 saved in Word document

### 6.3.6 AUS23

AUS23, a female student, claimed that task 3 was on the topic of English. She began her search using Google.com and typed “state places” as her search term. She saw at a glance from the search list that the results were not relevant, and said, “Nothing from this”. She used the back button and refined the search, and typed, “state of abbreviations list”. She clicked on the second result that appeared,

which was a list of United States abbreviations from [www.softschools.com/social\\_studies/state\\_abbreviations/](http://www.softschools.com/social_studies/state_abbreviations/). However, she did not choose any information from this site. She went back to Google and refined the search as “state farm” and clicked on the second result which was on [en.wikipedia.org/wiki/State\\_Farm\\_Insurance](http://en.wikipedia.org/wiki/State_Farm_Insurance). During the session, she clicked on five different websites in order to search for information for the required task. At this point, she asked me, “Could you please give me a clue?”. I advised her to re-read about the task, and asked her ‘It is about which state?’ She read, thought for a while and said, “Is this about the states of Australia” and I answered yes. She directly typed “state of Australia” into the search field and clicked on the first result at [http://en.wikipedia.org/wiki/States\\_and\\_territories\\_of\\_Australia](http://en.wikipedia.org/wiki/States_and_territories_of_Australia) (Figure 6.13). She read through the site and answered the task as shown below in Figure 6.14. After she finished typing, she said, “I like to change the font as it is not beautiful, see this is nice everyone can see it clearly”. She completed her task in 19 minutes.

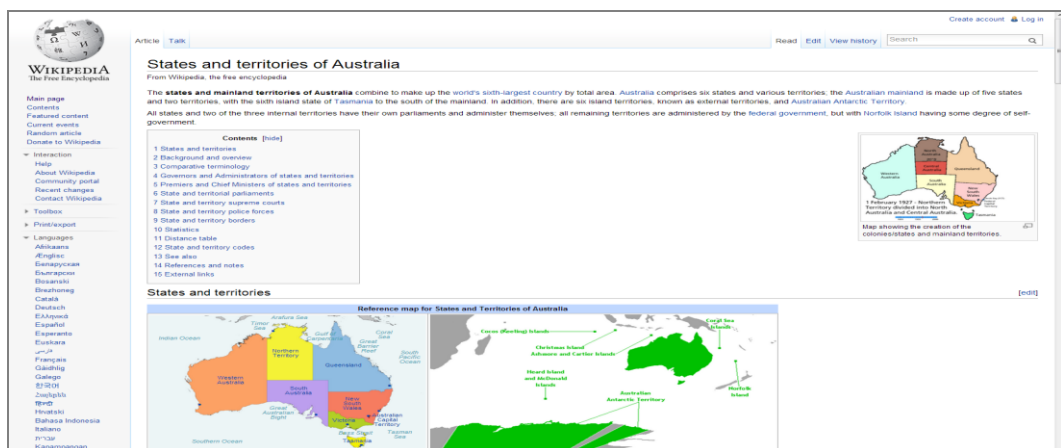


Figure 6.13: Site for answering questions  
(AUS23)([http://en.wikipedia.org/wiki/States\\_and\\_territories\\_of\\_Australia](http://en.wikipedia.org/wiki/States_and_territories_of_Australia))

AUS23

QUEENSLAND CAN ALSO HAVE  
MANY OTHER DIFFERENT  
GOVERNMENTS .

NEW ZEALAND THE LAW'S ARE  
MAD BY TERRITORY .

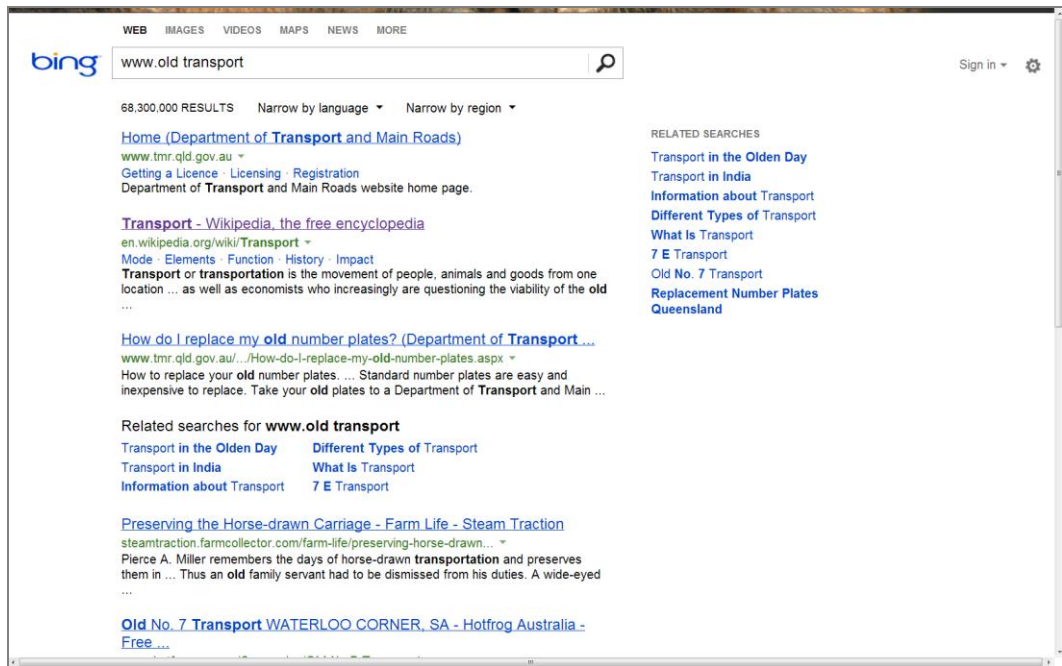
NORTHERN TERRITORIES THE  
AUSTRALIAN CAPITAL  
TERRITORY CAN BE NORFOLK.

Figure 6.14: Completed task by AUS23 saved in Word document

### 6.3.7 AUS7

The steps used by AUS7 in seeking information from the Internet were similar to the steps used by AUS8, AUS9 and AUS10. Each of these students answered the task based on their existing understanding and knowledge. AUS7 was a female student who understood that task 2 was about modes of transport. She carried out her search with Bing.com and typed “transport” in the search field. She took a quick look at the search results and saw nothing to be recorded in her answer. She then refined her search and typed “vehicle transport”. She said, “Nothing in here too”. She clicked the back arrow button and typed, “answer”. She deleted it and typed “www.old vehicle”, a message about errors appeared and no results could be retrieved. She refined the search again and typed “www.old transport” and after this fourth attempt, she said, “It’s ok, I learn this and know the answers”. The screenshot in Figure 6.15 shows that some of the search results this time did

include relevant sites to answering her task. However, AUS7 did not show any preference for selecting sites and decided to answer the task based on her knowledge. Her answer is shown in Figure 6.16. It took her about 8 minutes to answer the task given.



**Figure 6.15: Site for answering questions (AUS7)**

(http://www.bing.com)

AUS7

Trams, buses, and cars

Trams go on a long string that trails to where you want to go

Buses are a big kind of car.

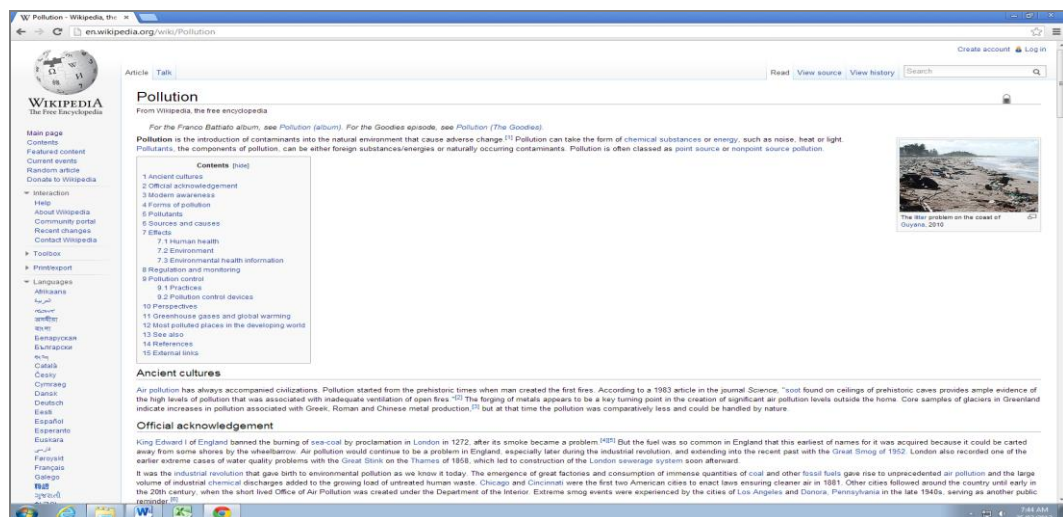
Cars are a little **veicle** that has four wheels.

They use no petrol or gas because they didn't have any

**Figure 6.16: Completed task by AUS7 saved in Word document**

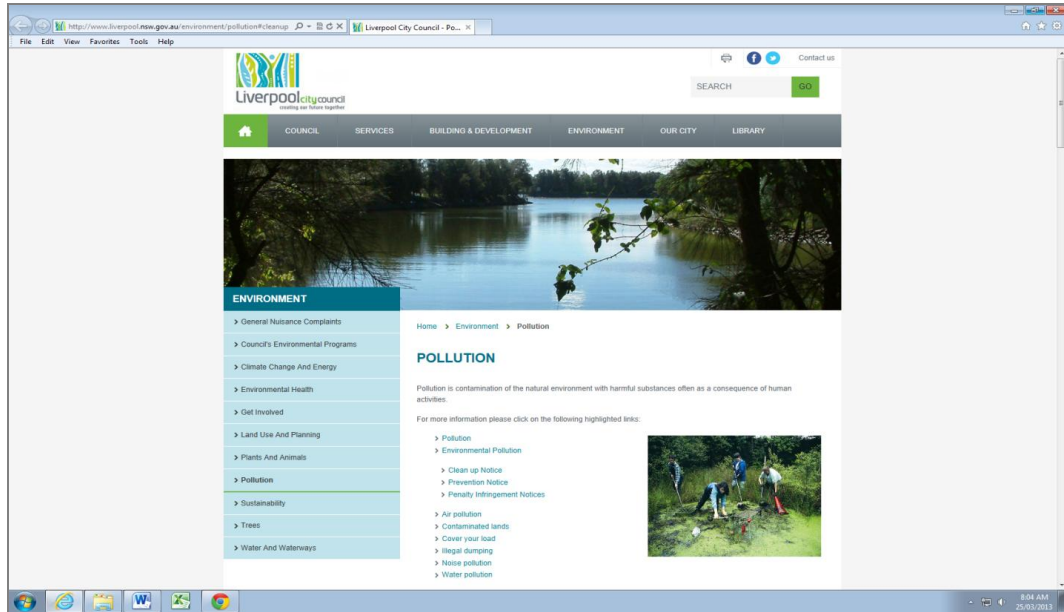
## 6.3.8 AUS3

AUS3 was a male 12 year-old student who decided that task 1 was on the topic of pollution. He confidently (feelings) went to Google.com as his search engine to begin information seeking. He typed “pollution” (key term used). On the search results page, he clicked the first result at en.wikipedia.org/wiki/Pollution (Figure 6.17). He read the first paragraph and said, “This is the answers”. He directly copied and pasted the information provided from the site. Then he used the back button to go back, and refined the search term, typing, “scope, type of pollution”. He clicked on the first result from www.liverpool.gov.au, read it through and repeated the same procedure, copying and pasting to a Word document for answering the second questions about type of pollution. Again, he went back using the back button, refined the search and typed “causes, effect water pollution”. He clicked on lifestyle.iloveindia.com/.../causes-and-effects-of-water-pollution-451 from the second result (Figure 6.19) and scrolled up and down, and finally managed to find the answer. He copied and pasted to the Word document, and said, “I’m proud of myself. It was fun and easy; you can find and learn anything from the Internet if you do not know the answer”. The answer completed by AUS3 is shown in Figure 6.20. AUS3 completed his task in about 6 minutes.



**Figure 6.17: Site for answering questions (AUS3)**

(<http://en.wikipedia.org/wiki/Pollution>)



**Figure 6.18: Site for answering second question (AUS3)**

([www.liverpool.gov.au](http://www.liverpool.gov.au))



**Figure 6.19: Site for answering third question (AUS3)**

([www.lifestyle.iloveindia.com/.../causes-and-effects-of-water-pollution-451](http://www.lifestyle.iloveindia.com/.../causes-and-effects-of-water-pollution-451))



### AUS3

**Pollution** is the introduction of contaminants into an environment that causes instability, disorder, harm or discomfort to the [ecosystem](#)

- [Pollution](#)
- [Environmental Pollution](#)
- [Clean up Notice](#)
- [Prevention Notice](#)
- [Penalty Infringement Notices](#)
- [Air pollution](#)
- [Contaminated lands](#)
- [Cover your load](#)
- [Illegal dumping](#)
- [Noise pollution](#)
- [Water pollution](#)



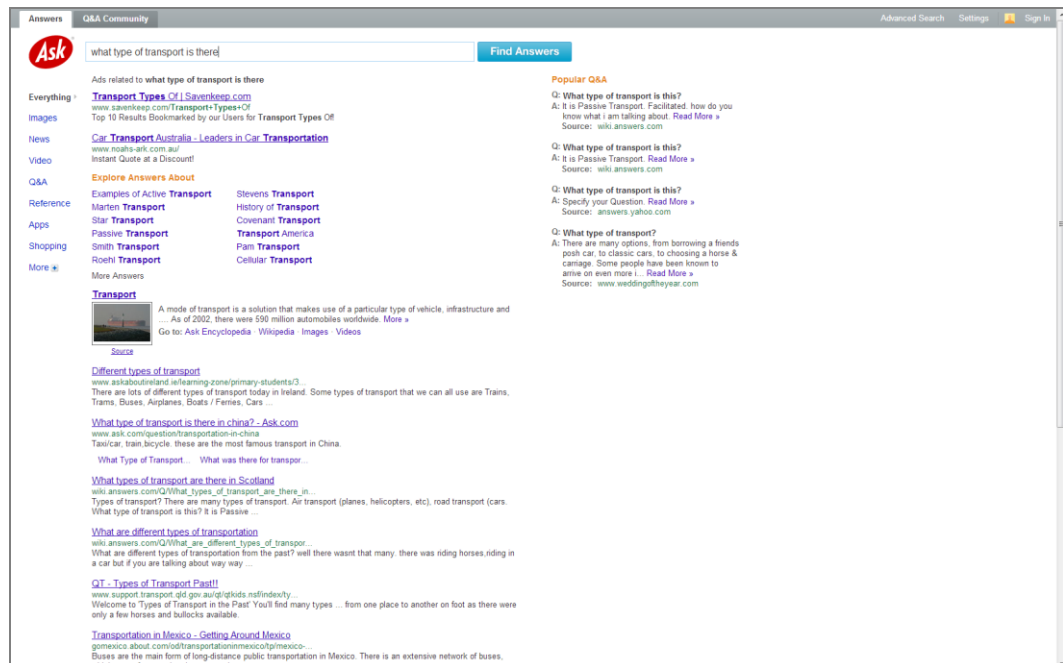
Water pollution has been seriously affecting the life of humans, plants as well as animals. The eco-system of rivers, streams, lakes, seas and oceans is also getting deteriorated due to the contamination of water, through various sources. This condition also leads to the outbreak of numerous diseases, majority of them being lethal and contagious. However, before going about finding a solution to the problem, we need to look into its underlying causes. In the following lines, we have provided information on the causes and harmful effects of water pollution. Go through them and then decide on your course of action.

**Figure 6.20: Completed task by AUS3 saved in Word document**

### 6.3.9 AUS4

AUS4 read through the task given to him and said “I do understand these questions and is all about transport” (knowledge domain). He then started his search by using Google.com and typed “ask.com”. Then he typed, “what type of transport is there” (key term used), as shown in Figure 6.21. From the list of

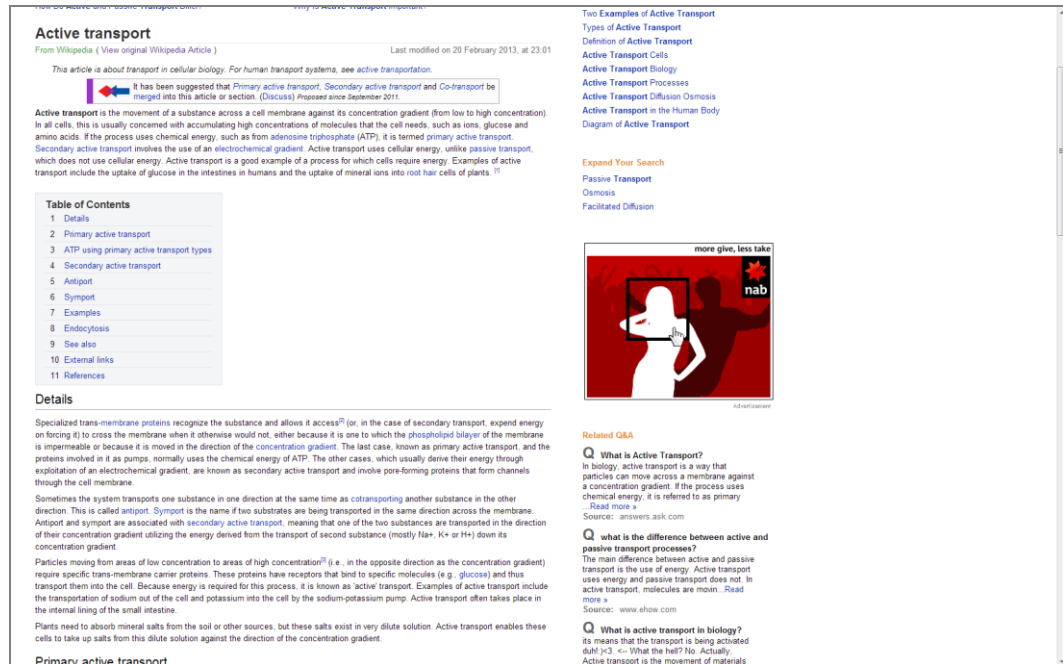
search results, he chose the Explore Answers About site, and mentioned that this link could provide him with the right answer as it mentioned “explore answers about”. He clicked on the first one, showing examples of active transport at [http://www.ask.com/wiki/Active\\_transport](http://www.ask.com/wiki/Active_transport) (Figure 6.22). From this link, he scrolled down and said, “Look I found the answers”. Then he copied and pasted the answer in a Word document (Figure 6.23) to answer question two. However, for question number one, the definition of transport was answered based on his own knowledge and ideas. AUS4 completed the task in 8 minutes.



**Figure 6.21: Site for answering questions (AUS4)**

([www.ask.com](http://www.ask.com))





**Figure 6.22: Site for answering questions (AUS4)**

([http://www.ask.com/wiki/Active\\_transport](http://www.ask.com/wiki/Active_transport))

AUS4

Public transport is not available to the village, however Bland Shire operates a Community Transport Scheme that is available to residents

Specialised trans-[membrane proteins](#) recognize the substance and allows it access (or, in the case of secondary transport, expend energy on forcing it) to cross the membrane when it otherwise would not, either because it is one to which the [lipid bilayer](#) of the membrane is impermeable or because it is moved against the [concentration gradient](#). The last case, known as primary active transport, and the proteins involved in it as pumps, uses the chemical energy of, usually, ATP. The other cases, which usually derive their energy through exploitation of an electrochemical gradient, are known as secondary active transport and involve pore-forming proteins that form channels through the cell membrane.

**Figure 6.23: Completed task by AUS4 saved in Word document**

### **6.3.10 AUS21**

AUS21, age 10, understood that the task given was about geography. She said, “I am confident (feelings) to search information from the Internet”. She began her search with a direct search using Google.com and typed “types of modes of transport” (Figure 6.24) as her search term. She said, “Normally the first results always give you the best answers”; however, she did not click on any of the search results listed and instead refined the search. This time, she typed “3 types of modes of transport” and clicked on the images option instead of the Web. She said, “I can choose whatever transport picture here, just click it like this [at the bicycle picture], copy, open Microsoft Word, and paste it. Drag the picture to make it bigger and put it in the middle”. After that, AUS21 wrote information below the picture. She said, “People will be more understand about information given that attach together with picture”. Next, she went back to the images from the Internet and looked for some more pictures. She chose “train”, repeated the same process and finally typed “car”. For question 3, she went back to the Internet, refined the search and typed “old style of transport”. She said, “See, it is easy, what you have to do is choose the picture that you like it, copy and paste it back to Word”. She chose a few pictures and pasted them. Then, she added some information about each picture. Finally, she saved the Word document using her name and said “If you want to change anything from this document, just Control S. This is all about technology, if you do not know, you will be miss everything”. The answer provided by AUS21 is shown in Figure 6.25. She completed her task in 15 minutes.



Q.1 & s2

Types of transport



This transportation is called a bike



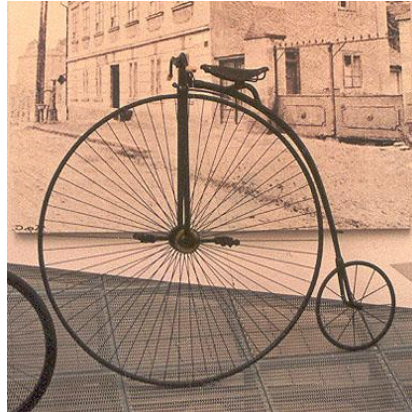
This is the Southern Pacific train that is possibly still working but, you never know what goes on in life.



This is another type of transport it's a car

They come in different colors and styles

Q. 3



The other one is called a penny – farthing



This is an old type of transport but, there is still some left in the city of Melbourne.



This photograph shows a pre-production sample  
Photograph courtesy of Exclusive First Editions © British Model Buses

This is a double bus with 2 levels one on the bottom & one on the top.

**Figure 6.25: Completed task by AUS21 saved in Word document**



## 6.4 Case Australia (Observation) Summary

The present case study explores the information-seeking processes of primary school children using the Internet for academic purposes in Australian school setting. The information seeking-processes for primary school children in the context of Case Australia is shown in Table 6.4.

<b>Kuhlthau's model of ISP</b>	<b>Australia</b>
Initiation	Knowledge domain Topic selection Reading and spelling skills
Selection	Search engine used Search strategies Search terms/keywords
Exploration	Search results Selection sites Navigational skills Reading and spelling skills Save information found in word document
Formulation	Evaluate relevant information and save word document
Collection	Choose and select the best information. Copy and paste Cut and paste Rephrasing Make summarization Copy images Construct own sentence
Presentation	Save in word document

**Table 6.4: Thematic analysis of Case Australia from primary school children observations**

## **6.5 Case Profile: Malaysia**

Two schools in Malaysia were investigated to form the second case study. Table 6.5 provides the details of the two schools. The first school is identified as MSIA1. This school was opened in 2001 and was selected as a pioneer school for the Smart School Pilot Project. The school has 77 teachers and 1108 students. The second school, referred to as MSIA2, was completed in 2002. There were 63 teachers and 902 students in 2010.

Both schools, MSIA1 and MSIA2, have the same mission, namely, “to develop the potential of individuals in a holistic and integrated manner so as to produce individuals who are balanced and in harmony with the nation’s aspirations”. The main objective of these schools is to provide the necessary infrastructure for the implementation of smart learning through the use of IT integrated with the curriculum and to develop human capital in order to ensure the progress of the nation.

Students attending both schools are mainly the children of employees of various government ministries who are based in, or live in, the area of Putrajaya. Putrajaya is a planned city, located 25kms from Kuala Lumpur; it serves as the federal administrative centre of Malaysia. The vision to have a new Federal Government Administrative Centre to replace Kuala Lumpur as the administrative capital emerged in the late 1980s, during the tenure of Malaysia's 4th Prime Minister, Dr. Mahathir Bin Mohamad, due to the overcrowding and congestion in the Kuala Lumpur area. Nevertheless, Kuala Lumpur remains Malaysia's national capital, as well as the country's commercial and financial centre. The development of Putrajaya started in the early 1990s; many major landmarks have been completed at the time of writing, and the population is expected to grow. The two primary Smart Schools are located in Putrajaya. Most of the students are Bumiputera, that is Malay, and the remainder are Indian and Chinese. In Malaysian primary Smart Schools, the Heads of ICT are responsible for the software and hardware in the school.

<b>Case</b>	<b>Country</b>	<b>Code</b>	<b>Type of school</b>	<b>Classes</b>	<b>Number of students</b>	<b>Cultural background</b>	<b>Language background other than English</b>	<b>Teachers</b>	<b>Location</b>
B	Malaysia	MSIA1	Primary, Government	YEARS 1-6	1108	Malay, Indian, Chinese	100%	77	Putrajaya
	Malaysia	MSIA2	Primary, Government	YEARS 1-6	902	Malay, Indian, Chinese	100%	63	Putrajaya

**Table 6.5: Details of two schools in the Malaysian case study**



## 6.6 Case Malaysia

The results reported in this section were derived from the observations of a group of Malaysian Smart School primary school children's information seeking on the Internet for academic purposes. Their search processes were captured through one-to-one observations. For these observation sessions, the subject population was reduced from 67 to 30 students, due to time constraints. Students ranged in age from 10 to 11 years. The selection of these students for participation in the observation sessions was made by the classroom teachers. The selection was random in nature. The details of the students are shown in Table 6.6. The profiles of ten students (shown in bold in the table) are discussed in detail in the following sub-sections to highlight their patterns of information seeking.

<b>Student ID</b>	<b>Age</b>	<b>Year</b>	<b>Gender</b>	<b>Task</b>	<b>Duration</b>
<b>MSIA1</b>	<b>11</b>	<b>5</b>	<b>MALE</b>	<b>2</b>	<b>10</b>
<b>MSIA2</b>	<b>10</b>	<b>4</b>	<b>MALE</b>	<b>3</b>	<b>16</b>
<b>MSIA3</b>	<b>11</b>	<b>5</b>	<b>FEMALE</b>	<b>1</b>	<b>20</b>
<b>MSIA4</b>	<b>10</b>	<b>4</b>	<b>FEMALE</b>	<b>3</b>	<b>12</b>
<b>MSIA5</b>	<b>11</b>	<b>5</b>	<b>MALE</b>	<b>3</b>	<b>15</b>
<b>MSIA6</b>	<b>10</b>	<b>4</b>	<b>FEMALE</b>	<b>2</b>	<b>12</b>
<b>MSIA7</b>	<b>10</b>	<b>4</b>	<b>MALE</b>	<b>3</b>	<b>5</b>
<b>MSIA8</b>	<b>11</b>	<b>5</b>	<b>FEMALE</b>	<b>2</b>	<b>6</b>
<b>MSIA9</b>	<b>10</b>	<b>4</b>	<b>MALE</b>	<b>2</b>	<b>6</b>
<b>MSIA10</b>	<b>11</b>	<b>5</b>	<b>MALE</b>	<b>3</b>	<b>7</b>
MSIA11	11	5	FEMALE	3	10
MSIA12	11	5	MALE	1	8
MSIA13	10	4	MALE	3	7
MSIA14	10	4	MALE	2	16
MSIA15	11	5	FEMALE	1	16
MSIA16	10	4	FEMALE	3	11
MSIA17	10	4	MALE	2	6
MSIA18	10	4	FEMALE	3	4
MSIA19	11	5	FEMALE	1	13

Student ID	Age	Year	Gender	Task	Duration
MSIA20	11	5	MALE	3	6
MSIA21	10	4	MALE	1	8
MSIA22	11	5	MALE	2	15
MSIA23	11	5	FEMALE	3	16
MSIA24	10	4	FEMALE	1	13
MSIA25	10	4	FEMALE	3	7
MSIA26	11	5	MALE	1	15
MSIA27	11	5	FEMALE	3	10
MSIA28	10	4	FEMALE	2	8
MSIA29	10	4	MALE	3	4
MSIA30	11	5	FEMALE	2	6

**Table 6.6: School children's ID, age, grade, gender, task and time taken – Case Malaysia**

### **6.6.1 MSIA1**

MSIA1, an 11 year old male student, did understand the task given to him (task 3) and said it was about the English language. He started with Google.com as his choice of search engine. He typed, “define transportation” (key term used) and clicked on the first search result at <http://www.thefreedictionary.com/transport> (Figure 6.26). He stated, “I learned this from my teachers as she said that if I do not know about something, just search the definition from dictionary”. He copied and pasted the definition of transport into a Word document. Then he went back and refined the search at Google. He typed, “types of transportation” (key term used and clicked on the third search result, which was about images. He said, “Picture have less text and there is no English language involvement for me to understand”. MSIA1 clicked on a few pictures, and copied and pasted them into the Word document. He repeated this three times since the task needed three modes of transportation. He named each type of mode of transportation that he chose. Finally he said to me, “After you finish your work, should save it”. The task completed by MSIA1 is shown in Figure 6.27. It took him about 10 minutes to complete the task.

# Observation of Primary School Children's Information-Seeking

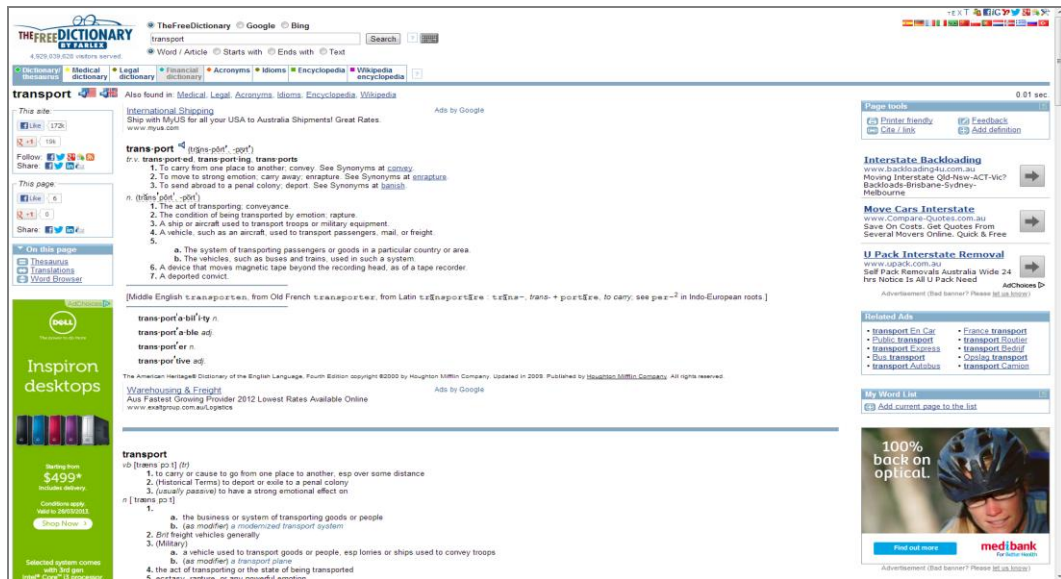


Figure 6.26: Site for answering questions (MSIA1)

([www.thefreedictionary.com/transport](http://www.thefreedictionary.com/transport))

1. .. To carry from one place to another



boat



airplane

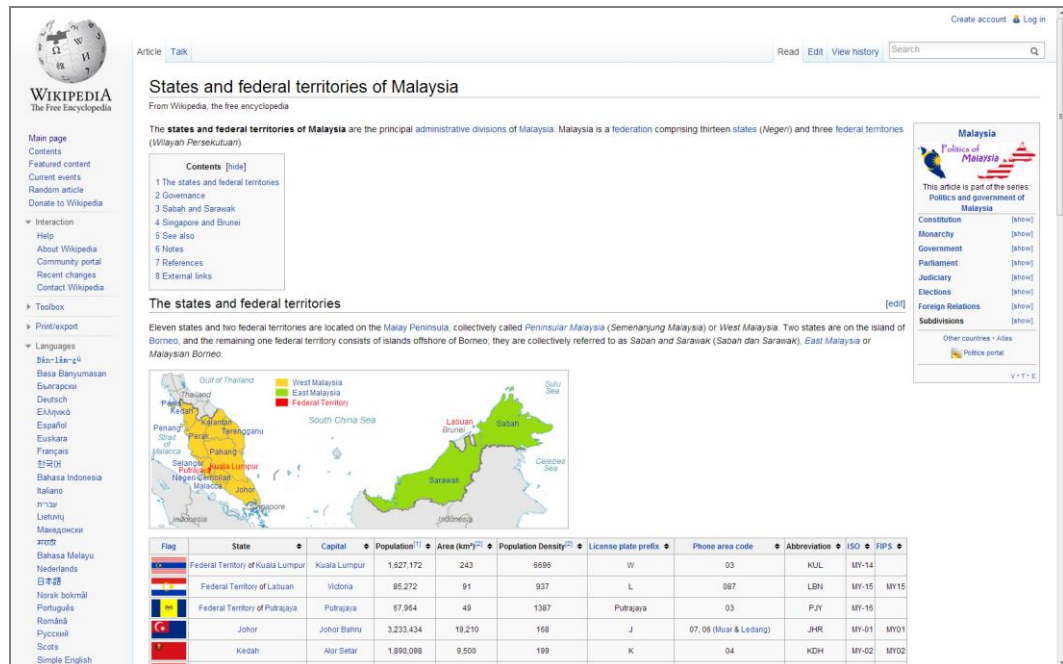


snowmachince

**Figure 6.27: Completed task by MSIA1 saved in Word document**

### **6.6.2 MSIA2**

MSIA2, a male student, understood that the task was related to the topic of the English language. Before he began his search, he asked me “What is the meaning of states”? (instruction or guidance) After explaining to him, he started his search with yahoo.com. He seemed nervous and scratched his head (feelings). He typed, “list three states in Malaysia” (key term used), clicked on the first result and moved the cursor. He went to [www.realestate2u.com.my](http://www.realestate2u.com.my). He did not read or record anything from that page. Then, he refined the search and typed “3 states in Malaysia”. He went back using the back button, and refined the search again, this time typing “three states in Malaysia”. He clicked on [http://en.wikipedia.org/wiki/States\\_and\\_federal\\_territories\\_of\\_Malaysia](http://en.wikipedia.org/wiki/States_and_federal_territories_of_Malaysia) (Figure 6.28). He said, “I like this site because it has a lot of pictures, text and information well written and structured”. He opened Microsoft Word, and typed Perak, Melaka and Selangor. On the Wikipedia homepage, he scrolled down and clicked on the heading “Perak” and followed the link. He read through and scrolled down and stopped at the tourism section. Then he said, “I will answer the best place to visit at Perak is Lumut. I have been there. It is a nice place”. He typed “Lumut” and added information to the Word document about Lumut which he got from the Internet. He repeated the same process with Melaka and Selangor. The answer given by MSIA2 is shown in Figure 6.29. He completed his task in 16 minutes.



**Figure 6.28: Site for answering questions (MSIA2)**

([www.en.wikipedia.org/wiki/States\\_and\\_federal\\_territories\\_of\\_Malaysia](http://www.en.wikipedia.org/wiki/States_and_federal_territories_of_Malaysia))

## MSIA2

1.Perak

2.Melaka

3.Selangor

1.Lumut because the warm water are perfect for swimming and diving while atmosphere is simple relaxing

2.Fort A Famosa Constructed by thePortuguese in 1511. It suffered severe structural damage during the Dutch invasion.

3.The town caters largery tourists coming this way en route to Kelip-Kelip at Kampung Kuantan or local travelers on a trial of seafood binging.

**Figure 6.29: Completed task by MSIA2 saved in Word document**

### **6.6.3 MSIA3**

Despite the fact that before the observation sessions a brief verbal introduction was given to the students to explain the research and how the observations would be conducted, before MSIA3 started seeking information from the Internet, she asked me “Is this a test?” (feelings). After telling her that it was not a test and that no evaluation would be made of this task, she began her seeking with a direct search and typed “sains [science in Malay language].com” (Figure 6.30). The search provided a sponsored listing and Web search results. However, she did not click on anything and instead refined the search. She typed “sains.com” (Figure 6.31) and clicked on the first search result from the sponsored listings from <http://www.rhta.com.au/> (Figure 6.32). She looked through the list and said, “I do not think this is the right site because there is no information about pollution”. She proceeded with her search and this time she typed “bacteria”. She made no selection of the sites resulting from the search and said to me, “But do not worry, I will get help”.

She went back to the direct search and typed, “help for readers”. Then, she clicked on the first search result which was from a sponsored link. However, access to that website was not permitted by the Ministry of Education, Malaysia. After spending about 13 minutes searching on her own, she looked frustrated and said “I need your help”. I asked her if she understood what the task required and she said “Yes, I do understand this task is about science and not really sure what is the answer”. I guided her with a few questions such as asking her what search engine she normally used for seeking information and how she derived her search terms. After listening to my questions, she directly went to Google.com and typed “science direct”. She said, “This is not right too”, and pressed the back button and refined the search term by typing “pollution”. She clicked a search result which was the Wikipedia homepage and finally managed to find the answers from Wikipedia sites. She took 20 minutes to complete her task and she managed to answer all the questions. The answer provided by MSIA3 is shown in Figure 6.33.

## Observation of Primary School Children's Information-Seeking

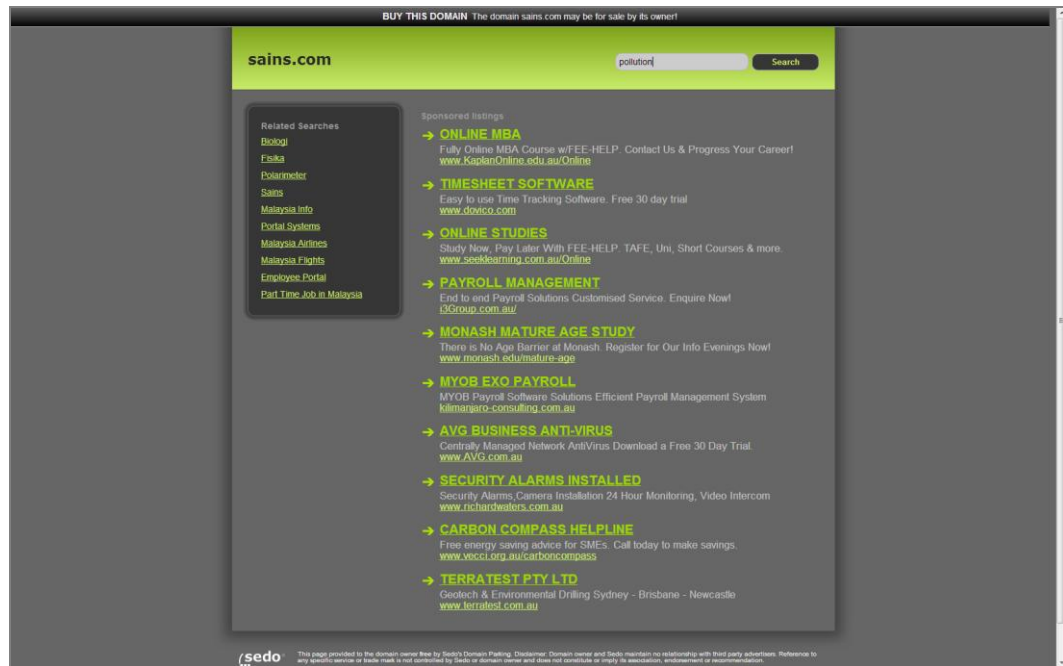


Figure 6.30: Site for answering questions (MSIA3)

(www.sains.com)

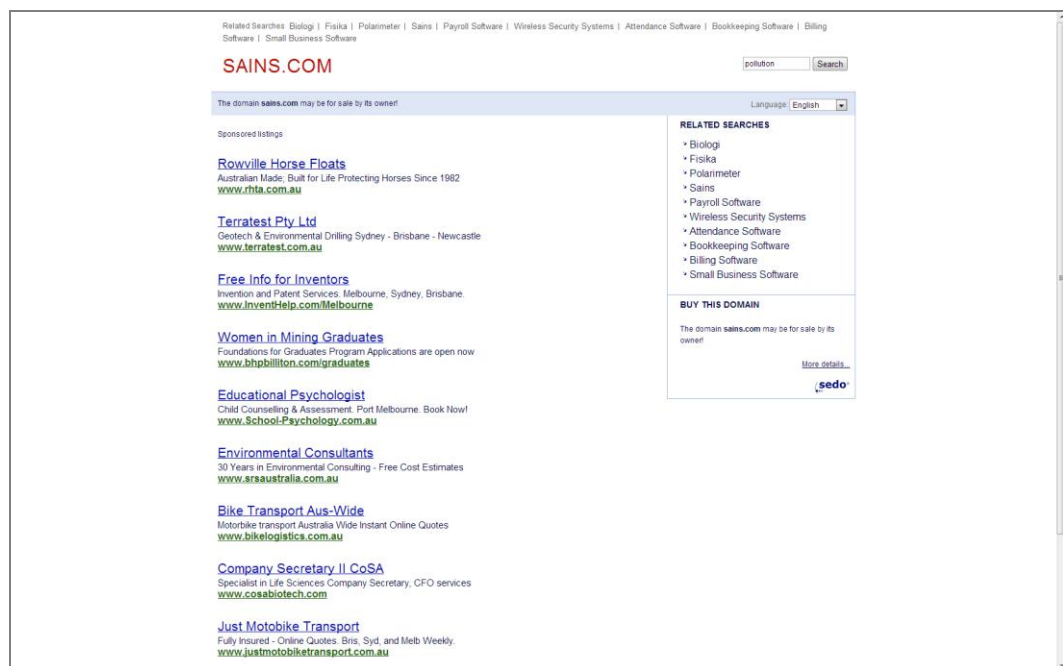
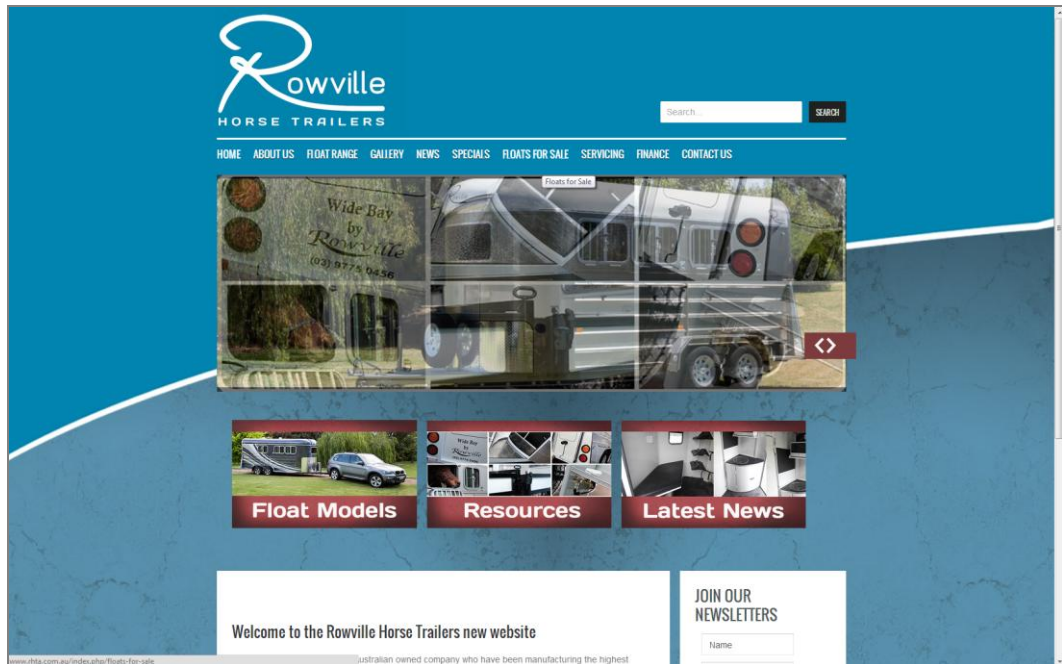


Figure 6.31: Site for answering questions (MSIA3)

(www.sains.com)





**Figure 6.32: Site for answering questions (MSIA3)**

(<http://www.rhta.com.au/>).

### MSIA3

1. **Pollution** is the introduction of contaminants into the natural environment that cause adverse change.<sup>[1]</sup> Pollution can take the form of **chemical substances** or **energy**, such as noise, heat or light. **Pollutants**, the components of pollution, can be either foreign substances/energies or naturally occurring contaminants. Pollution is often classed as **point source** or **nonpoint source pollution**.
2. **Air pollution, water pollution, noise pollution, environmental pollution, soil pollution, gaseous pollution.**
3. **Pesticides, fertilizers, oil, gasoline, mining. = causes.**
4. **Food chain is damaged, diseases can spread, acid rain, altered water temperature, marine food source are contaminated.=effects.**
5. **Reducing pesticide, reduce urban/suburban runoff of lawn fertilisers.=solution**

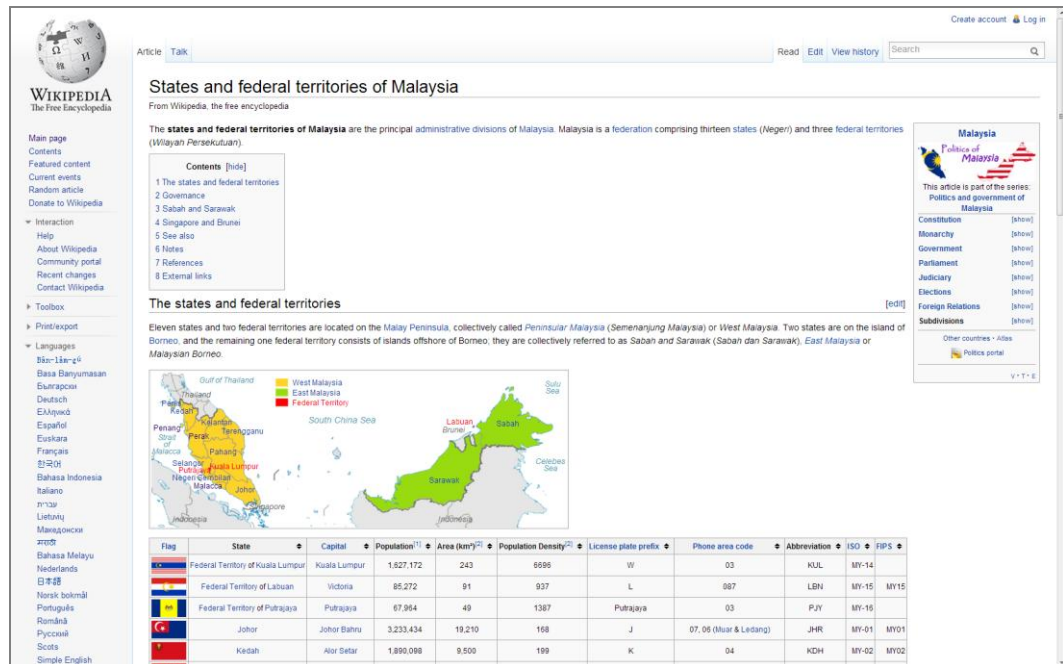
**Figure 6.33: Completed task by MSIA3 saved in Word document**

#### **6.6.4 MSIA4**

MSIA4, a female student aged 10 years old, read through the task and asked me, “If I know how to do this, what will I get?” Students seemed to want to perform if they knew they would get something in return (feelings). I said, “Just do it and I will give you something”. She said that, “This is easy, because I always watched my dad doing this when we going for a holiday”. She began her search with Google.com and typed “3 states in Malaysia”. She clicked on the first result at [http://en.wikipedia.org/wiki/States\\_and\\_federal\\_territories\\_of\\_Malaysia](http://en.wikipedia.org/wiki/States_and_federal_territories_of_Malaysia) (Figure 6.34). She opened a Microsoft Word document and went back to the Wikipedia homepage, read through it, and copied and pasted related information found from the site. While doing her searching she stated that:

My dad said it is easy to find information from the Internet, easy to understand, you learn a lot of new things and if I do not understand something, I will ask my father. At the same time, I also learn and improved my English. I have no problem with the Internet because I being used it since I was small.

In the Microsoft Word document, she typed “Johor”, “Kedah” and “Kelantan”. She said, “In Malaysia this is the most interesting place to visit. I went there before with my father and mother”. Then, she continued to read Wikipedia, clicked on the heading “Johor”, scrolled down and up and down again and stopped at “Legends about Awang’s spear returned to Dayang”. She said, “This is interesting”, then she copied and pasted in the Word document. She went back using the back button, and refined the search of Kedah, and went directly to the tourism section and clicked on Langkawi. She repeated the same process of information seeking by clicking on Kelantan and copying and pasting the information that she wanted. The answer provided by MSIA4 is shown in Figure 6.35. She completed her task in 12 minutes.



**Figure 6.34: Site for answering questions (MSIA4)**

([http://en.wikipedia.org/wiki/States\\_and\\_federal\\_territories\\_of\\_Malaysia](http://en.wikipedia.org/wiki/States_and_federal_territories_of_Malaysia))

MSIA4

1.Johor, Kedah, Kelantan

#### 6.6.4.1 2. Awang's spear returned to Dayang (JOHOR)

*Lembing Awang Pulang ke Dayang (Awang's spear Returned to Dayang)* is an incident that occurred in Parit Raja, [Muar](#).

It occurred in 1776 when a man called Awang returned to Parit Raja after more than 3 years abroad to marry his fiancée Dayang. Upon his return, he found out that another man called Bachok had told Dayang of Awang's death and she was to be married to him the next day. Awang showed up at the wedding and using a spear given by Raja [Bugis](#), he speared Bachok in the stomach. Bachok, fatally injured, grabbed the spear in his stomach and speared his best man. The man then speared the next man he saw and this was repeated until the 99th person was speared. It was Dayang's father who was protecting Dayang. He did not continue the repeated spearing and died. Awang ran away to [Endau](#) and Dayang did not marry another until she died.

Lang Kawi (red eagle with with head) or in Malaysia Language Helang Kawi (KEDAH)

(KELANTAN)Before this place was known as Pasir Putih, it was known as Pangkalan Limbungan. The town of Pasir Putih derived its name after Sultan Muhammad IV visited this place. The Sultan was very impressed to see the white sand shining along the riverbanks. Hence in 1911, the Sultan declared the name of this place as Pasir Putih, which meant white sand. This is the place where a Kelantan warrior, [Tok Janggut](#), raised an army of [Malay](#) warriors to oppose the introduction of taxation in Kelantan.

Figure 6.35: Completed task by MSIA4 saved in Word document

### **6.6.5 MSIA5 & MSIA6**

MSIA5, a male student, and MSIA6, a female student, shared similarities in their approach to seeking information from the Internet. They both said they understood the task given, and they both directly went to Google.com and chose images. From there, they typed in search terms related to places that they knew such as Penang, and when they found information about the places, they copied and pasted it into Word documents. Both students already had a basic knowledge about places and transport but at the same time they needed to get ideas from the pictures that they chose. They then found some information related to the pictures they chose. MSIA5 completed the task in 15 minutes and MSIA6 completed the task in 12 minutes. The answer provided by MSIA5 is shown in Figure 6.36 and the answer provided by MSIA6 is shown in Figure 6.37.

MSIA5



Penang

An island with rich multicultural history full of colonial heritage and Chinese influence.



Pulau Langkawi

Pristine rainforests, caves with stunning stalactites and beautiful beaches washed by clear emerald waters.



Genting Highlands

If you are looking to spend some quiet time to relax, this may not be the ideal vacation location especially during peak season.

**Figure 6.36: Completed task by MSIA5 saved in Word document**

MSIA6



1.the movement of substances across the memb ranes cells.

a.monorel

b.bus

c.ship

d.motorcycle

e.tanker

f.car

**Figure 6.37: Completed task by MSIA6 saved in Word document**

#### **6.6.6 MSIA7**

MSIA7 began his search with Lenovo.com as his search engine. Lenovo.com is the homepage that appears in the school computers. However he seemed stuck and did not do anything. He then continued by looking at shop.lenovo.com and could not find anything. He thought for a while and said “It is ok because I know the answer”. He asked me to translate the task given from English to Malay language and then directly answered it in the Word document. MSIA7 wrote the answer in the Malay language referring to bus, taxi and rail. He completed his task within 5 minutes. The answer provided by MSIA7 is shown in Figure 6.38.

### **6.6.7 MSIA18 and MSIA29**

MSIA18 and MSIA29 carried out their information seeking in a similar way to MSIA7. They also became stuck in their attempts to find information on the Internet, and then answered the questions to the best of their own knowledge. Both of them completed the task in 4 minutes. The answer provided by MSIA18 is shown in Figure 6.39 and the answer provided by MSIA29 is shown in Figure 6.40.

- |  |
|--|
| <ol style="list-style-type: none"><li>1.Bas,teksi,rel</li><li>2.Pengangkutan bermaksudkenderaan yang membawa seseorang atau sesuatu dari satu tempat ke satu tempat yang lain.</li></ol> |
|--|

**Figure 6.38: Completed task by MSIA7 saved in Word document**

MALACCA- Al Azim mosque, Baba Nyonya Heritage Museum, KEDAH- City Plaza Alor Setar, Mukim Kangkong, PENANG-Eastern & Oriental Hotel, Penang Ferry Service.
--

**Figure 6.39: Completed task by MSIA18 saved in Word document**

- |   |
|---|
| <ol style="list-style-type: none"><li>1. Mallaca- Taman Merdeka</li><li>2. Sarawak- Kuching</li><li>3. Langkawi- Pulau Dayang Bunting</li></ol> |
|---|

**Figure 6.40: Completed task by MSIA29 saved in Word document**

### **6.6.8 MSIA8 & MSIA9**

MSIA8 and MSIA9 took the easy way of seeking information on the Internet. Both of them used Google.com as their search engine and directly typed, “transport”. They clicked on the first search result which was Wikipedia.com and copied all of the information that appeared and then pasted it into a Word document. Both of them completed the task in 6 minutes. The answer provided by



MSIA8 is shown in Figure 6.41 and the answer provided by MSIA9 is shown in Figure 6.42.

1. Transportation or transport, the [British English](#) term, is the movement of people and goods from one place to another. The term is derived from the [Latin](#) *trans* meaning *across* and *portare* meaning *to carry*.  
  
The field of transport has several aspects, loosely they can be divided into a triad of [infrastructure](#), [vehicles](#), and [operations](#). Infrastructure includes the transport networks ([roads](#), [railways](#), [airways](#), [canals](#), [pipelines](#), etc.) that are used, as well as the nodes or terminals (such as [airports](#), [train stations](#), [bus stations](#) and [ports](#)). The vehicles generally ride on the networks, such as [automobiles](#), [trains](#), [airplanes](#). The operations deal with the control of the system, such as [traffic signals](#) and [ramp meters](#), [railroad switches](#), [air traffic control](#), etc, as well as policies, such as how to [finance](#) the system (e.g use of [tolls](#) or [gas taxes](#) in the case of highway transport.).  
  
Broadly speaking, the design of networks are the domain of [civil engineering](#) and [urban planning](#), the design of vehicles of [mechanical engineering](#) and specialized subfields such as [nautical engineering](#) and [aerospace engineering](#), and the operations are usually specialized, though might appropriately belong to [operations research](#) or [systems engineering](#).  
  
2. **Transport** or **transportation** is the movement of [people](#) and [goods](#) from one location to another. Transport is performed by [modes](#), such as [air](#), [rail](#), [road](#), [water](#), [cable](#), [pipeline](#) and [space](#). The field can be divided into [infrastructure](#), [vehicles](#), and [operations](#).  
  
Infrastructure consists of the fixed installations necessary for transport, and may be [roads](#), [railways](#), [airways](#), [waterways](#), [canals](#) and [pipelines](#), and [terminals](#) such as [airports](#), [railway stations](#), [bus stations](#), [warehouses](#), [trucking terminals](#), refueling depots (including fueling docks and [fuel stations](#)), and [seaports](#). Terminals may both be used for interchange of passengers and cargo, and for maintenance.  
  
Vehicles traveling on these networks may include [automobiles](#), [bicycles](#), [buses](#), [trains](#), [trucks](#), [people](#), [helicopters](#), and [aircraft](#). Operations deal with the way the vehicles are operated, and the procedures set for this purpose including financing, legalities and policies. In the transport industry, operations and ownership of infrastructure can be either public or private, depending on the country and mode.  
  
3. Automobiles, bicycle, buses, trains, trucks, people, helicopters and air craft.

**Figure 6.41: Completed task by MSIA8 saved in Word document**

1. the movement of people and goods from place to place, and related terms such as:
    - *transport*, used (especially in military contexts) to mean a vehicle to carry supplies or personnel, , e.g. [transport aircraft](#) or [transport \(ship\)](#)
    - [Transport industry](#)
    - [Penal transportation](#), also known as "sentence to transport".
    - [List of transport topics](#)
  2. [bicycles](#), [cars](#), [motorcycles](#), [trains](#), [ships](#), [boats](#), and [aircraft](#)
  3. A **bicycle**, **bike**, or **cycle** is a pedal-driven, [human-powered vehicle](#) with two [wheels](#) attached to a [frame](#), one behind the other. A person who rides a bicycle is called a **cyclist** or a **bicyclist**.
- Bicycles were introduced in the 19th century and now number about one billion worldwide, twice as many as [automobiles](#).<sup>[1]</sup> They are the principal [means of transportation](#) in many regions. They also provide a popular form of [recreation](#), and have been adapted for such uses as children's [toys](#), adult [fitness](#), [military](#) and [police](#) applications, [courier](#) services, and [competitive sports](#)

Figure 6.42: Completed task by MSIA8 saved in Word document

### 6.6.9 MSIA10

MSIA10 did not understand the task given to him due to the English language. It was necessary for me to explain and translate it for him. He began his search with Google.com and typed “jenis kenderaan” in the Malay language; this means “type of transportation”. It then appeared as <http://www.jkrkedah.gov.my/> (Figure 6.43). He did not record anything from this site and went back to Google to refine the search. He said, “Could you please help me again to translate ‘jenis kenderaan’ in English?” I helped him and he typed “mods of transpot” [modes of transport]. His spelling errors created confusion. Even though Google showed results for modes of transportation, as shown in Figure 6.44, he clicked on the Google message “Search instead for mods of transpot” and he clicked on the first search result of

<http://www.moddb.com/mods/wargames-zerohour/images/norad-transpot-chopper> (Figure 6.45).

Again Google.com tried to help him with the search results selection by presenting this option: “Did you mean: modes of transport”; however, he clicked on the first result as his site selection. He finally said, “I have to answer this task based on my own idea”. He then answered the question in a Word document by listing the modes of transportation that he knew, as shown in Figure 6.46. He completed his task in 7 minutes.



**Figure 6.43: Site for answering questions (MSIA10)**

(<http://www.jkrkedah.gov.my/>)

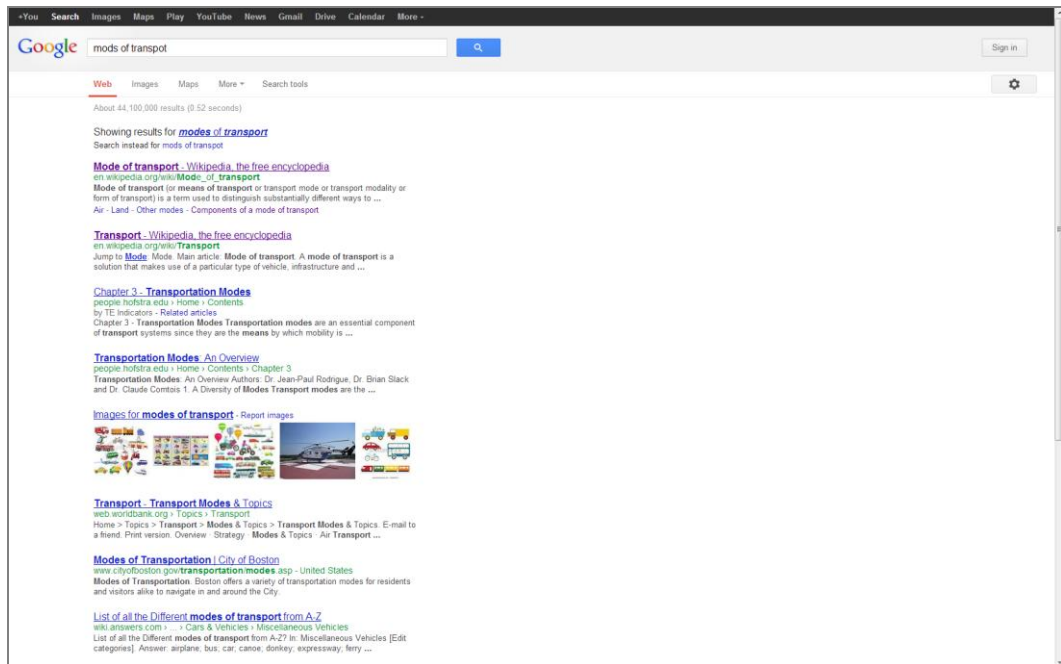


Figure 6.44: Site for answering questions (MSIA10)

(www.Google.com)



Figure 6.45: Site for answering questions (MSIA10)

(http://www.moddb.com/mods/wargames-zerohour/images/norad-transport-chopper)

Kl express
Taxi
Limosine

**Figure 6.46: Completed task by MSIA10 saved in Word document**

## 6.7 Case Malaysia (Observation) Summary

The present case study observes information-seeking processes using the Internet for academic purposes by primary school children in Malaysian school settings. In the context of Case Malaysia, information-seeking processes for primary school children was derived based on Kuhlthau's model shows as Table 6.7.

<b>Kuhlthau's model of ISP</b>	<b>Malaysia</b>
Initiation	Subject matter Topic selection Reading and spelling skills Translation/Meaning Teacher help
Selection	Search engine used Search terms, keywords Spelling skills
Exploration	Search results selection Navigational skills Selection sites Web to images Reading skills and spelling skills
Formulation	Not applicable
Collection	Copy and paste Cut and paste List the answers Construct own sentence Scroll and choose random answers Click and jot down the answers on paper Show the answers from images

<b>Kuhlthau's model of ISP</b>	<b>Malaysia</b>
Presentation	Save in word document

**Table 6.7: Thematic analysis of Case Malaysia from primary school children observations**

## **6.8 Summary**

The observations of Malaysian and Australian school children provide a real picture of how they seek information from the Internet in a school setting. The information-seeking processes were investigated based on Kuhlthau's six-stage model. From the observations, school children are computer savvy but they are lacking information seeking skills. Some appear to be over-confident in their searching abilities and many have a tendency to cut and paste passages from the Internet into Microsoft Word documents without any refinement. In many cases, primary school children have difficulties retrieving accurate or relevant information due to spelling errors, poor reading skills and a lack of understanding of the English language, especially those from Malaysia. It seems a number of children treated the information-seeking task as a test with some rushing to finish their search as a result.

The main difference in the pattern of information-seeking processes for Malaysia and Australia (from observations as shown in Table 6.8 below) is that Malaysian school children tend to skip the formulation stages, meanwhile there is only one student from Australia that did go through the formulation stages. Furthermore, Malaysian children had to work harder on the tasks, as it is was not written in Malay language.

<b>Kuhlthau's model of ISP</b>	<b>Australia</b>	<b>Malaysia</b>
Initiation	Knowledge domain Topic selection Reading and spelling skills	Subject matter Topic selection Reading and spelling skills Translation/Meaning Teacher help
Selection	Search engine used Search strategies Search terms/keywords	Search engine used Search terms, keywords Spelling skills
Exploration	Search results Selection sites Navigational skills Reading and spelling skills Save information found in word document	Search results Selection sites Navigational skills Reading and spelling skills Web to images
Formulation	Evaluate relevant information and save word document	Not applicable
Collection	Choose and select the best information. Copy and paste Cut and paste Rephrasing Make summarization Copy images Construct own sentence	Click and jot down the answers on paper Copy and paste Cut and paste List the answers Scroll and choose random answers Construct own sentence Show the answers from images
Presentation	Save in Word document	Save in Word document

**Table 6.8: Thematic Analysis of Case Australia and Case Malaysia from primary school children observations**

The next chapter provide findings derived from the qualitative research – interviews of teachers.

## **7 Teachers' Perspectives of Primary School Childrens' Information Seeking**

### **7.1 Introduction**

The following findings are based on interviews carried out as a means of data collection. This chapter discusses the categories and concepts of the information-seeking process based on Kuhlthau's theoretical model that developed information-seeking as a set of themes. The findings represent data from a case study using open-ended questions posed during the semi-structured interviews of Year 4 and Year 6 teachers carried out in Australia and Malaysia. The presentation of the results begins with an overview of the study in Australia referred to as "Case Australia", followed by the interpretations of Australian teachers' perspectives of the information-seeking processes among primary school children. The results related to "Case Malaysia" are then discussed. The results of Case Australia and Case Malaysia are discussed individually, due to the different nature and context of their education systems. Cross-case analysis is later applied in both cases.



## **7.2 Information-Seeking Process of Primary School Children in Australia**

The interview findings are reported based on Kuhlthau's theoretical model of the information-seeking process depicting common patterns of tasks, feelings, thoughts, and actions in six stages: initiation, selection, exploration, formulation, collection, and presentation. The following discussion is based on feedback from interviews with ten teachers in total, from two schools from Victoria, Australia. Table 7.1 provides an overview of the teachers' position and years of teaching experience.

<b>Code</b>	<b>Country</b>	<b>Position</b>	<b>Teaching experience</b>
AUST1	Australia	Teacher	7 years
AUST2	Australia	Teacher	35 years
AUST3	Australia	Teacher	6 years
AUST4	Australia	ICT Teacher	5 years
AUST5	Australia	Teacher	16 years
AUST6	Australia	ICT Teacher	17 years
AUST7	Australia	Teacher	5 years
AUST8	Australia	Teacher	25 years
AUST9	Australia	Teacher	27 years
AUST10	Australia	Teacher	10 years

**Table 7.1: Details of teachers interviewed in Australian case study**

### **7.2.1 Stage 1: Initiation**

The information-seeking process begins after the teacher gives an assignment to the students. According to the interviewees, primary school teachers in Victoria encourage students to use the Internet appropriately in order to complete the assigned subject matter. As explained by AUST1, "all subjects benefit from Internet research and I really encourage them to use the Internet for research purposes; either they work individually or with a partner". In the Victorian education system, there is no specific subject to be used with the Internet.

Teachers have the freedom to choose which subjects need further exploration through the Internet. AUST3 added that the decision to include the Internet depends “on the topic and research area, if the students are interested in the topic or research area they will search for the information, but if the topic is dry and hard to comprehend students resist or are hesitant”. However, some of the teachers motivate the students for specific purposes. For example, according to AUST10, “for every session, especially for reading, I encourage the students to use the Internet. And for inquiry topics, they have to do research”. It has been understood that at primary schools in Victoria, teachers are given the freedom to choose the subject for which they think it is appropriate to use the Internet to support the curriculum.

AUST5, however, presented a different approach towards using the Internet during the early stages of problem-solving. According to AUST5, “some weeks might indicate [using the Internet] 10 different times; sometimes it is based on the subject, or sometimes (2 or 3 occasions) if the students ask me questions related to the subject, I will ask them to go and find it on the Internet”. From another point of view, some of the longer serving teachers preferred to teach using traditional methods, and seldom encouraged the use of the Internet to seek information for academic purposes. For example, AUST8 explained, “I use the Internet 2 or 3 times a week, but if I give the students free time as they manage to complete their assignment before end of the class session, they like to go to the games site”. Furthermore, as AUST2 claimed, “I teach the students using the old way; it is really hard to deliberately get them on the Internet to discover knowledge”.

In the Initiation stage, the teachers felt that their experience in using the Internet did influence the students in their attempts to seek information for academic purposes. Most of the teachers found that students did not have a problem using the Internet if they had a computer and Internet access at home. AUST1 stated that the students “grew up with a computer, and about 80% of them have Internet [access] at home as we did a school survey last year (2010)”; for these students, “Obviously they have great understanding to begin with”. Furthermore, according to the teachers, all the children had grown up with computers and had the basic

skills of using the computer – they are “digital savvy” (AUST1). AUST6 stated that “the more the students use the computer and the Internet, the more they understand how to seek information from the Internet, especially with kids who have a computer with Internet access at home; this helps them to improve in areas such as reading and spelling”. However, according to AUST2, “at this young stage they just play games, not only learning games sometimes shooting games ... students join and play Mathletics across the world every day, [and this] makes them improve but not to gain knowledge”.

### 7.2.2 Selection Stage

With regard to the selection stage, students start to select topics to search for using the Internet. They consider possible outcomes of their choices and they select the most likely search engine, such as Yahoo! or Google, to get the answers. AUST1 reported using Google, Yahoo Kids or Wikipedia as these are generally reliable: “I then ask the school children to find keywords based on what they think are important issues, or they type the questions in the search box, for example what is the capital city of Victoria? Just type it and Google will do the rest”.

After that, the school children choose possible topics based on their knowledge and assignment guidelines. They continue to talk to their friends and teachers for guidance. As AUST4 explained, “some of the school children need help identifying the appropriate keywords to be inserted into the search engine”. This is because “most of the time the students type the entire question” (AUST10). Therefore, teachers need to guide the students in order for them to get appropriate information from the Internet and to complete their assignments. Different teachers have different styles of showing the children how to use the Internet as an information-seeking tool. Both ICT teachers reported in the interviews that they often teach the children skills for seeking information on the Internet. AUST6 reflected, “I teach the students skills, and introduce them to the various resources. I also teach them about Internet safety [which is part of the Australian Government requirement], how to use Internet Explorer and buttons such as the address bar, and how to insert the URL address”. Teachers also assisted students

when they keyed in the wrong spelling of a search phrase or a word, which resulted in them not being able to find what they were looking for. Other elements that assisted the student's attempts to search for information on the Internet included "keywords, front pages and hyperlinks" (AUST6).

Similarly, AUST4 explained that before her students started searching for information on the Internet she will "give them a clue, for example; find five best sites for this". Instead of giving the keywords, the teacher helps the students by focusing on which sites are relevant to the nominated topic. The teacher and the students will then discuss the site to assess whether it is a good site, by considering the source of the information such as whether it is a government site or another kind of information provider?" AUST4 added that the students follow instruction, "so you have to explain step by step, and later they can be more dependent as they come along".

Some of the teachers had already identified relevant websites that were suitable for the students to use in order to complete their assignment before they handed out the assignments. AUST3, for example, tended to "write down a couple of website URLs on the board which are related to the assignments for the students to refer to". In these instances, the school children follow directions in their efforts to find information on the Internet. However, according to AUST8, students need to "choose the right word/keyword and spell it correctly [in order to ensure that they are] able to identify relevant information". AUST1 explained that "after doing some demonstration to them but some of them forgot, so I show them informally between one to two students such as type the whole questions".

### 7.2.3 Exploration Stage

In the exploration stage, students need to explore the information available on the Internet to learn about their topic in order to complete the assignments. AUST4 explained that "when the search result appears, if you click the first search result, you have to read it first. You need to identify who wrote the text and whether it was written by a professional". The teachers encouraged students to check the

credibility of the author and content of text written on the Internet. This is to make sure the content is accurate and the information is up-to-date. One criterion is that the text must have references. According to AUST1, students are advised that “if it does not look like a trustworthy site go back and go through the other search results”. Most students, however, “insert their search requests into Google and wait for the search results” (AUST1). AUST3 explained that “usually, the students select the first search result/option provided as they assume that it will provide them with a lot of information”. The students attempted to gather as much information as possible from the Internet; they opened more than one site and scanned the information in order to get the best and right answers for their assignment. AUST5 added that “some students scan the text first to assess whether the information is worthy or valid. The more they use the Internet the more they understand which search results are the most appropriate”. In addition, AUST6 claimed that, “depending on the students, some of them have great skills. They know how to scan through the whole page from top to bottom and some of them need minimal guidance. For example, when the students were learning about Australian frogs, I asked them to start by first reading about frogs. This allowed them to understand the subject matter prior to attempts of looking for information on the Internet”. AUST3 stated that “the more they use it the more understand on how to seek information from Internet and a good literacy level will also help them especially in spelling and reading”.

However, according to the teachers, some of the students did not know what to do and these students required guidance from a teacher who sits beside them and teaches them step by step. AUST3 explained that even though the use of Google, Yahoo Kids or Safe Search was demonstrated to the students, some of them forget the procedures so it was necessary to show them individually or in small groups. In the exploration stage, teachers described correct spelling as one of the challenges for the students: “to get spelling right when typing into the search box” (AUST1); “often I have to write the word on the board and, aside from spelling, the students find inappropriate content or content that is hard for them to understand” (AUST5); “if the students cannot spell or spell the website wrongly,

they will obtain incorrect answers” (AUST8). AUST4 explained that “sometimes I ask them to work together three or four so that they can literally read the content and correct each other, but sometimes they might confuse each other”. One experienced teacher stated that in order to overcome this problem, “I sit with the children when they start searching to guide them to sites where text will be more at their reading and comprehension level. I also suggest websites that will be at their level” (AUST9). According to AUST2, “it totally depends on the sites, if it is designed for children, there should be no problem but if it is for adults, they need to read slower, try to understand and normally the children do not have the patience for it”.

### 7.2.4 Formulation Stage

In the fourth stage – formulation – in theory, the students should focus on specific topics that they find to be the most closely related to the assignment. The students should read the information found on the Internet carefully, make notes regarding themes that were related to answering their assignment, and later combined all the themes to form answers. Teachers encouraged students to gather as much information as possible from the Internet; to open more than one site and scan the information in order to get the best and right answers for their assignment. However, according to the teacher interviews it seems that the students did not normally go through this process, jumping straight to the collection stage. AUST6 stated that “normally the kids want answers quickly and to get the task completed fast. Only a few students adapt the information they find. The other students simply read, and restructure the answers in order to complete the assignment”. According to AUST5, this situation happens often, as “normally the students are not patient; they just want to finish the task quickly”. Judging by the small amount of discussion in the interviews with teachers, it was clear the formulation stage was less of an issue for students—and teachers.

### **7.2.5 Collection Stage**

In the collection stage, students, in theory, gathered all pertinent information and organised it in order to complete the assignment. At this point, some of the students just copied the information from the Internet for the sake of getting answers to the questions. AUST6 stated that “the students will filter and compile the information on their own. If they do copy from the Internet, they need to make sure that it is referenced. But often the stories from the Internet are long, so I get them to summarize the story or look for shorter stories”. Some of the teachers guided the school children at this stage and told them to save the information found first before they answer the assignment. AUST4 reported also asking the students to save the information that they thought was relevant to answering the assignment. AUST4 explained that they then “open the document, re-read and rephrase the words, save or scan it before re-writing the appropriate answers. The more explanation and guidance given to them makes them more independent”. Some of the teachers liked using the Internet for the purpose of locating information because students could also see images. This was because, for students who had difficulty understanding concepts, the concepts could be easily explained based on the images. As AUST7 explained, “depending on the task assigned, images are easier for students to find as they can cut and paste the images. Furthermore, the students are totally confident and understand that the images are the right answers for their assignment”.

### **7.2.6 Presentation Stage**

The final stage is the presentation stage when the students complete the information search or task and are ready to submit. At this stage, again the teachers had to explain what they expected from the assignment before the students submitted their assignment. AUST1 agreed that “yes, normally from when the task is assigned, I explain what is expected of them. The students have to follow the required format and the expectations in preparing their presentation”. At the same time, the teachers had to remind the students not to plagiarise other people's work: “I teach them that in order not to plagiarise other people's work,

you need to quote and reference the works before submitting the final assignment” (AUST6). Different assignments have different requirements of submission. AUST3 explained that “some assignments need the students to submit a paper copy, others such as if we are doing a bush ranger assignment as a group they look up the information from the Internet and present it to the class, and for Mathematic assignments they just email me”.

### **7.3 Case Australia (Interview) Summary**

Table 7.2 below shows a thematic analysis of the Australian case views of primary school children's' information-seeking processes from the Internet, from the teachers' perspectives based on Kuhlthau's ISP model of six stages. Australian teachers felt that students should be free to choose what to explore and investigate from the Internet. This is to encourage and motivate them to use the Internet to improve their knowledge, reading skills, and research skills. This process will also give them familiarity and experience in order to solve a problem. Detailed discussion will be provided on this topic in the cross case analysis in Section 7.6.



## Teachers' Perspectives of Primary School Childrens' Information Seeking

Kuhlthau's six stages of ISP	Sub-Theme derived from Kuhlthau's model	Australian Interview Findings
Initiation	<p>All subjects</p> <p>Freedom for student</p> <p>Experience, familiarity and knowledge</p> <p>Research skill &amp; Reading skill</p>	<p>"all subjects benefit from Internet research and I really encourage them to use the Internet for research purposes; either they work individually or with a partner" (AUST1).</p> <p>The decision to include the Internet depends "on the topic and research area, if the students are interested in the topic or research area they will search for the information, but if the topic is dry and hard to comprehend students resist or are hesitant" (AUST3).</p> <p>The students "grew up with a computer, and about 80% of them have Internet [access] at home as we did a school survey last year (2010)"; for these students, "Obviously they have great understanding to begin with" (AUST1).</p> <p>"the more the students use the computer and the Internet, the more they understand how to seek information from the Internet, especially with kids who have a computer with Internet access at home; this helps them to improve in areas such as reading and spelling" (AUST6).</p>

## Teachers' Perspectives of Primary School Childrens' Information Seeking

Kuhlthau's six stages of ISP	Sub-Theme derived from Kuhlthau's model	Australian Interview Findings
Selection	<p>Search engine used</p> <p>Keywords</p> <p>Instruction and guidance</p> <p>Search results list</p>	<p>..”using Google, Yahoo Kids or Wikipedia as these are generally reliable” (AUST1).</p> <p>“some of the school children need help identifying the appropriate keywords to be inserted into the search engine” (AUST4).</p> <p>This is because “most of the time the students type the entire question” (AUST10).</p> <p>“choose the right word/keyword and spell it correctly [in order to ensure that they are] able to identify relevant information” (AUST8).</p> <p>“I teach the students skills, and introduce them to the various resources. I also teach them about Internet safety [which is part of the Australian Government requirement], how to use Internet Explorer and buttons such as the address bar, and how to insert the URL address” (AUST6).</p> <p>“write down a couple of website URLs on the board which are related to the assignments for the students to refer to” (AUST3).</p> <p>“give them a clue, for example; find five best sites for this” (AUST4).</p>

## Teachers' Perspectives of Primary School Childrens' Information Seeking

Kuhlthau's six stages of ISP	Sub-Theme derived from Kuhlthau's model	Australian Interview Findings
Exploration	<p>Trustworthiness of sites</p> <p>Sites selection</p> <p>Sites design</p> <p>Spelling skills</p>	<p>“when the search result appears, if you click the first search result, you have to read it first (AUST4).</p> <p>“if it does not look like a trustworthy site go back and go through the other search results” (AUST1).</p> <p>“usually, the students select the first search result/option provided as they assume that it will provide them with a lot of information” (AUST3).</p> <p>“it totally depends on the sites, if it is designed for children, there should be no problem but if it is for adults, they need to read slower, try to understand and normally the children do not have the patience for it” (AUST2).</p> <p>“to get spelling right when typing into the search box” (AUST1).</p> <p>“often I have to write the word on the board and, aside from spelling, the students find inappropriate content or content that is hard for them to understand” (AUST5).</p> <p>“if the students cannot spell or spell the website wrongly, they will obtain incorrect answers” (AUST8).</p>

## Teachers' Perspectives of Primary School Childrens' Information Seeking

---

<b>Kuhlthau's six stages of ISP</b>	<b>Sub-Theme derived from Kuhlthau's model</b>	<b>Australian Interview Findings</b>
Formulation	Restructuring the information found	"The other students simply read, and restructure the answers in order to complete the assignment" (AUST6).
Collection	<p>Copying of information</p> <p>Filtering &amp; compile</p> <p>Rewording &amp; Summarizing</p>	<p>"depending on the task assigned, images are easier for students to find as they can cut and paste the images" (AUST7).</p> <p>"the students will filter and compile the information on their own" (AUST6).</p> <p>"open the document, re-read and rephrase the words, save or scan it before re-writing the appropriate answers" (AUST4).</p>

## Teachers' Perspectives of Primary School Childrens' Information Seeking

Kuhlthau's six stages of ISP	Sub-Theme derived from Kuhlthau's model	Australian Interview Findings
Presentation	<p>Format presenting the information</p> <p>Plagiarism &amp; References</p> <p>Presentation &amp; Discussion</p>	<p>"yes, normally from when the task is assigned, I explain what is expected of them. The students have to follow the required format and the expectations in preparing their presentation" (AUST1).</p> <p>"I teach them that in order not to plagiarise other people's work, you need to quote and reference the works before submitting the final assignment" (AUST6).</p> <p>"some assignments need the students to submit a paper copy, others such as if we are doing a bush ranger assignment as a group they look up the information from the Internet and present it to the class, and for Mathematic assignments they just email me" (AUST3).</p>
Assessment	Reward such as free time and playing games	"I use the Internet 2 or 3 times a week, but if I give the students free time as they manage to complete their assignment before end of the class session, they like to go to the games site" (AUST8).

**Table 7.2: Thematic analysis of Case Australia from teachers' perspectives**

## 7.4 Information-Seeking Process for Primary School Children in Malaysia

As for the discussion above, related to the Australian case study, the findings for the Malaysian case study are also reported based on Kuhlthau's theoretical model of the information search process. This model depicts common patterns of tasks, feelings, thoughts, and actions in six stages: initiation, selection, exploration, formulation, collection, and presentation. The following discussion is based on the feedback provided during interviews with 10 teachers. The objective of the interviews was to identify the information-seeking processes employed by the students in the two schools from the teachers' perspectives. Table 7.3 provides an overview of the teachers' positions and years of experience.

Code	Country	Position	Teaching experience
MSIAT1	Malaysia	Teacher/ Head of ICT	4 years
MSIAT2	Malaysia	Teacher/Malay Language	23 years
MSIAT3	Malaysia	Teacher/Malay Language	5 years
MSIAT4	Malaysia	Teacher/Malay Language	10 years
MSIAT5	Malaysia	Teacher/English Language	3 years
MSIAT6	Malaysia	Teacher/English Language	17 years
MSIAT7	Malaysia	Teacher/Malay Language	5 years
MSIAT8	Malaysia	Teacher/English Language	7 years
MSIAT9	Malaysia	Teacher/Head of ICT	12 years
MSIAT10	Malaysia	Teacher/English Language	8 years

**Table 7.3: Details of teachers interviewed in Malaysian case study**

### 7.4.1 Initiation Stage

In Malaysia it is compulsory for students in Years 4 to 6 to use the Internet within language subjects, which are the Malay and English languages. As mentioned earlier, primary Smart Schools are equipped with Internet facilities to support teaching and learning processes within the curriculum. MSIAT1 claimed that learning via the Internet "is used by Malay language and English teachers because

there are specific programs on the computers. Computer literacy for the Malay and English language is scheduled in the timetable for two different times, one hour a week". These two subjects are conducted in the computer lab provided, where students share computers between them. In some classes, two or three students share a computer. This is due to limited computer facilities, which are not adequate to support the number of students. Student numbers range from 35 to 45 students per class. However, this does not mean that the Internet cannot be used for other subjects. MSIAT1 added, "For other subjects, it is up to the creativity of the teachers themselves. They can enter the access centre at any time in the afternoon. Everything else is in the lab. But for the study of the Malay language and English classes are scheduled, and for other subjects it is based on walk-ins and availability".

As Head of ICT, MSIAT1 added that the use of the Internet "depends on the suitability of the subject and also on the software that is provided or given". MSIAT1 continued:

I teach Mathematics, but sometimes when I teach the subject, I also use the Internet, for example in looking up forms of currency for foreign countries. I would give the students the topic or title and the students will search on their own. Usually I will show the students how to search first, after that they apply [what they have learnt] and attempt the search themselves. Once the students enter the lab, most of them know what to do and how to use the computer and the Internet.

The first focus that needs to be considered is what syllabus is being followed while using the Internet to support the teaching and learning process for primary school children. In this study, at the initiation stage teachers encouraged students to use the Internet based on the assigned syllabus content. As MSIAT3 suggested, "for the Malay language, EdWeb [Education Web: <http://eduwebtv.com/v2/home/>] is now supplied, but not the entire syllabus has been supplied with the related sites, it is very limited. So, if we are discussing

roads (functions, etc.) there is a website on roads as well as a quiz. CDs are also provided". Teachers have to follow the syllabus that has been provided by the Ministry of Education. According to MSIAT4, for example, "I like to choose current issues. According to my syllabus, this week is the topic on roads. Students are required to look for facts regarding issues such as how to avoid road accidents".

Normally, teachers will teach based on the relevant syllabus in the classroom. The classroom session is followed by a session in the computer literacy class for further exploration of the topic by using the Internet. For example, MSIA5 said that "in class we teach Malay language structures and comprehension". MSIA5 continued to explain: "later, teachers continue with the same content in the computer literacy class, and students need to access information regarding language structures and they will read the information such as information on verbs, collective nouns, idioms, synonyms and antonyms". The students will read and try to understand, "or if they have difficulties, ask the teacher" (MSIA5).

The teachers encouraged students to practice what they learned through the online exercises that were available from the Internet. MSIAT4 explained as follows: "then, we ask them to try the exercises on the computer on their own. But the exercises on the computers do not reveal marks/scores based on right or wrong answers. They only give answers of A, B, C or D, the students mark the closest answer. When they're done, the students cannot check the answers." The teachers found that to be the weakness of the programs provided in the websites, especially for the Malay language subject. There were no answers provided and limited information from the Internet that was relevant to the topic and syllabus. According to MSIAT2, "for compositions, I have yet to find a suitable online example. What is available now are comprehension texts and language structure or grammar exercises. The writing examples that I find are not suitable as they are often too high of a standard, mostly for the UPSR [Ujian Penilaian Sekolah Rendah: Primary School Evaluation Test] exams."



While the teachers' main priority was to find syllabus content that was relevant on the Internet, they also considered that the class composition and the ability of the students influenced the use of the Internet in the classroom. MSIAT3 stated: "it all depends on the student"... [for an advanced student,] "We give them one title/topic, and ask them to write an article as well as seek out additional information such as pictures etc." (MSIAT3). For weaker students, simpler, more entertaining topics are suggested:

We put on an interesting CD and let them watch, because if we were to assign a similar task they would not be able to complete it. Even to type 'www' causes them to remain blank. So, in order to provide them with an example, we have to deal with the students one-on-one at their tables. Access to the Internet is according to class, and according to the student's skill. Not all students can easily perform an Internet search.

According to MSIAT4, "I teach an advanced class, with gifted students. So it is not a problem. All I have to do is tell the students what type of information I need. The students are familiar with Google. All they do is type in the word. For example, for a Malay language grammatical question, all they have to do is type 'Year 5 Malay language grammar questions'. After which, we (the students and I) decide whether the answers/suggestions are suitable or not". The teachers also found that if the students had computers with Internet access at home they did not have many problems in seeking information using the Internet. MSIAT5 stated that "if the students come from a good class, there are usually not many problems because they are used to using the Internet at home".

The teachers also found that no matter how clever and experienced the students were, the students still needed proper guidance from them. As MSIAT3 stated:

I usually give them the topic. I will tell them the topic that I need. Sometimes I will tell the students that the topic is hard, so I need to explain and make things clearer. For example,

elements for avoiding a road accident. What are the elements? The reasons?. So, if the students type in 'elements' and do not get an answer, then can they try typing in 'reasons' or 'causes'. I give them alternatives. This makes it easier for the students to understand. If too many suggestions arise, that too causes confusion.

MSIAT4 explained that "another strategy to guide the students to use the Internet for the Malay language subject comes from the student portal. Usually, the other teachers select the questions, put it in the student portal and share the information. For example, before this, some teachers used 'Score A'. However this no longer in used and could not be found. 'Score A' contains 5 subjects: Malay Language Studies, English, Maths, Science and ... I cannot remember". Teachers collaborated and shared appropriate sites that were relevant to the syllabus. MSIAT2 explained this practice as follows:

I usually try to use language and sites in the national language [Malay Language] from within Malaysia only. These sites are created by teachers or from Malay Language experts. All we have to do is open the site and use it. There are sites that are of suitable standards and those that are not.

Most sites focus on the UPSR exams and some sites are not level-specific for specific groups. According to MSIAT2, "sometimes I play word games to enhance their skills. I give the students one or two words, and then they search. Those who can identify as many words as possible, get a reward. Even the students get bored with too many exercises, so I vary things a little. I usually do this once a week".

For MSIAT6, this process occurred as follows:

I will lead them first and then I will leave them. But I will go around from one computer to another and make sure they are on

the right track. In certain situations they have to use the Internet with me and in certain situations they have to go on by themselves. From my point of view, I think the teachers should be there in the computer lab, if not, the students will get lost.

### 7.4.2 Selection Stage

In the selection stage, the second stage of the search process, students select topics to research. A few specific sites are suggested by the Ministry of Education, and teachers have to choose sites for students to use to seek information from the Internet. MSIAT1 stated: “the URL is given by the teacher to the student to use and search. And normally if the URL is not suitable for the school children, it will be automatically blocked by the GITN [school security network] that is provided by the Telecom Malaysia”. This point was also agreed on by other teachers. MSIAT4 claimed that “currently, the search engines used are free of choice”. Initially, software was provided but within the last few years, “the software has become obsolete, maybe because the school computers are old. There are server problems, computer problems, and the software cannot be accessed. The school would buy the software. The software would contain notes and lots of exercises; we could choose the notes according to topics” (MSIAT1).

One of the Malay language teachers (MSIAT2) explained the steps as follows:

I search on the Internet and make sure the students all use the same site. Yahoo! only. If we use too many sites, we do not achieve the same standards. So we standardise them. From the very beginning, I guide and control the students because if not, all kinds of things would happen and we won't achieve the targeted objectives.

The teachers had to make sure the students used the most suitable search engine in order to complete the assignments given. Most of the teachers gave a suggestion of sites to use. MSIAT3 explained that “when I teach, I usually ask the students to

look up on Yahoo! When they type the search details, suggestions will appear. With more advanced students, they will tell you that they have found various types of articles that can be added to the search". The teachers claimed some students were hard-working and put in their own efforts at home to explore topics related to the topics that they would be learning the next day. These were students with Internet access at home.

There was a different scenario for the weaker students, as the teachers had to guide them from the beginning until they can find the relevant information. MSIAT2 claimed that "I teach them the basics. For example, how to type caps [capital letters]. They have yet to develop their skills. For example, if I were to ask them to enter the EdWeb site, they do not know what to do. I only have an hour to teach, it is usually not enough for me to go around to all the students because they do not know how to type". The teachers also encouraged students to use and access the sites at home. This is because the more they use the Internet, the more knowledge derived from it. According to MSIAT2, "I explain that they can also access the site at home on their own. For them to do the same thing at home. It is a practice for those who have computers at home". MSIAT10 added, "If I want to give homework to the students, I have to search something for the kids first, then only I will ask them to go to this website. They cannot really go there freely because it is very new for them. Sometimes they miss one word then it will go to something else".

MSIAT9 reported using a few websites that she found to be relevant to and interesting for the students: "For Level 1, there are a few simple websites that I use, for example a word-building website such as starfall.com. Another website is wordworld.com, there is also another website, if we type the word 'pot', and the site forms images". The teachers applied different methods of teaching and learning to different levels of students. MSIAT9 explained in more detail as follows:

At Level 2, it is more about methods of designing brochures etc.  
For the Year 5 syllabus, we study 'Places of Interest'. So, the

student will look for places they want to go and create their own brochure. For Year 4, we study 'Great Inventors'. The students will search on the website as well. Currently, we are working on the Year 5 projects and we're making a Big Book. From the Internet, the students search 'Big Book', its procedures and the steps involved in making it. There is also a sample. We're now in the process of making the Big Book.

Some teachers, such as MSIAT9, used the usual search engines such as Yahoo and Google: "I'll ask them to type things that they want to search, for example the image of a bougainvillea. Just type the word of bougainvillea and type image, then search. That's all".

However, Malay language teachers found it hard to find suitable sites for the subject. MSIAT2 claimed "there are a few websites suggested by the Ministry. I have to search on the Internet and we use them from there. It all depends on the teacher's initiative and sometimes private companies will load up sites that we can use. For example, with Malay language structures, comprehension etc. For compositions, I have yet to find suitable online examples. What is available now are comprehension texts and language structure or grammar exercises. The writing examples that I find are not suitable as they are too high a standard, often for the higher level of education".

Normally teachers do suggest keywords to students: "for example, for the Big Book project, I give the keyword. The students will search the Big Book. From there, there is a simple Big Book example such as 'Mom's Big Book'. The students will select the one they want or like. Sometimes they check with me first" (MSIAT7).

Good students normally do not have many problems with finding keywords. MSIAT10 explained that "however, for Year 2 and Year 4 classes, because I teach the weaker groups, they are slightly slower at exploring/surfing the Internet. Sometimes, I even have to type in the URL address for them". The teachers found

that some students did not even know how to use the 'back' function and the majority had English language problems as most of the reading materials were in English. The teachers encouraged the students to bring dictionaries to help with understanding. At the same time, the teachers had to find sites that offered simple information about the topic. MSIAT10 explained the steps as follows:

So, I search for websites that contain short stories. I will search for the site first and later introduce it to the class. [However], this is only for the weaker classes. Another thing, for these classes I usually determine the story that they are going to read. All the students would be reading the same story, and we will discuss the difficult words using the dictionary. Their typing skills are also a little slow [Year 2 and Year 4]. There are even students who do not know words that have the same meaning. So I usually use a drilling strategy with these weaker classes, it takes time for them to understand and remember the vocabulary. Those are a few of the problems that I face.

The Malay language teacher (MSIAT3) also taught skills classes (writing and reading classes, known as Latihan Kemahiran in Malay language). So the teacher already knew the level of the students' reading and writing skills. MSIAT3 explained as follows:

For me, I teach the class for 11 hours per week as the total of Malay language subject and Latihan Kemahiran. More or less 7 hours in the class and the remaining hours in the lab. Therefore, I can identify students who can read or not. Why should I try to teach them computer literacy, when it is more important for me to teach them to read first? At least, by the end of the class, the student would have gained a bit more knowledge. So not only do the smart students gain an advantage but focus is on the weaker students too. I provide the weaker students with CDs

which they start clicking by answering A or B. At least, they know how to use a mouse and a keyboard.

One of the teachers said that in order to make the students pay attention, she had to find interesting websites that have animated pictures, video clips and songs. MSIAT5 explained, for example, that “when I showed them the ‘starfall’ website, they did not move from their chairs and were so engrossed because the website was interesting. There are various pictures, songs, pronunciation exercises etc. There are images, songs, movies, video clips and various other things that the students can see. Usually, when the students first enter the lab, I will assign them tasks. Only those who have completed their tasks are allowed to look at games. But today I have allowed them to freely explore the web. And they are totally enthralled. The games that I refer to are learning games”.

For MSIAT7, giving the students good articles from the Internet will gain their interest:

I give for example, good articles, often those that have pictures/illustrations, provide reasons, have examples, just like when we read the newspaper. It becomes better when there is colour, can be downloaded, and there are illustrations from the Internet, multimedia etc. It is good to see students happy after they accomplish a task. It does not have to be long, but if they can write an interesting paragraph, which can capture the readers' emotions, then that is a good piece.

### 7.4.3 Exploration Stage

The third stage is when students explore information to learn about their topics. It is often the most difficult stage. This is because, when using a search engine, students found that numerous search results appeared and they did not know which one to choose. According to MSIAT8, “So we have to explain it to them and select the best option. We have to tell them to check each search result and

look for the information that they need. The weaker students are often confused as to the best option available. We have to help them analyse the information that is needed”.

The teachers encouraged the students to evaluate the relevant results found and choose the most related to the assignments: “Usually, when we tell the students that the article is free choice, it is a problem. For example, articles from universities are too high a level. I tell them to choose simpler ones or those from online newspapers. I remind the students that they have to read, and if the article is too difficult, to change to another. Because I don’t have time to go through them one by one. So I tell them that they have to skim through the article” (MSIA3). Some teachers had their own way of teaching or giving clues to the students for selecting from the search results that appear: “I tell students that the first few ones are the best. I tell them to pick the top options first and go down the list according to priority. If we give them a topic in Malay and ask them to search in English, they get a little confused. But for those who are fluent in English, they don’t have any problems, as they translate the meaning. They have no problems with their reading” (MSIAT4).

However, MSIAT3 suggested that, “for me, because the Ministry designs the syllabus, it is better for the Ministry itself to set up everything so that the teachers can link to the sites. When things are general, that too is good because they give the students exposure. When the students read, they understand further. Sometimes, students want to know more. For those who are lazy, we only open sites that are already there. We have to open a different window for the students to use, so they do not go off track too far. If not, they tend to go off far from the original task, even to overseas sites”. The teachers claimed that students often lacked the habit of reading: “So I encourage them to read as much as possible. It is now the reading age, if they do not read, they will be left behind. We learn new things from things we don’t know” (MSIAT7).

A majority of the students in these schools were competent at using computers. This may be because they had been exposed to using the computer starting from



Year 1, and in Year 4 they were introduced to using the Internet. According to MSIAT5, “if they begin at Level 1 (Year 1 until Year 2), by the time they reach Level 2 (Year 3 until Year 4) there is usually no problem. Some of them are so much advanced. They read everything; finish their assignment and they straight away go to games. That’s the problem I always have with advanced students”. The teachers also complained there were problems with weaker students. For example, MSIAT10 stated that “Another thing, some of them are too slow. I have to guide them one by one. And some of them just like to watch pictures and explore the images only. Once they on their computer, they’ll like to go to the school web where there’s a lot of pictures. They’ll explore that particular web only. They’ll pick at random. There’s a long list there but they’ll choose the first few”.

### 7.4.4 Formulation Stage

Teachers encourage students to gather as much information as possible from the Internet and open relevant sites so that students can retrieve relevant information. Teachers emphasise the need to choose the information to use based on the credibility of the authors so that the information is as accurate as possible and up-to-date. While this was fine in theory, the students did not appear to do this in practice; this is an important finding of the study as it does not reflect the processes articulated in Kuhlthau’s model.

### 7.4.5 Collection Stage

In the fifth stage – collection – students collect information specifically for the topic rather than on all aspects of the subject in general. MSIAT8 explained that “we give the students the resources and all they have to do is edit. So they have lesser steps to follow. For weaker classes, they just copy. Because if we ask them to search for information, they do not know how to find it.” The teachers found that weaker students were attracted to resources that have sound, and were therefore more immediately interesting. It was hard to get them to read. In addition, the number of students in the class became an issue when it came to the

lab sessions in which the students had to share a computer. This provided students with a limited time to explore the Internet. According to MSIAT9, “if we had to teach them, we would have to reduce the number of students in a class. For example, if we have to teach 36 students in an hour, one student needs between 5-10 minutes each, and this is not enough. In addition, the students have to share, and at times, in sharing, they do not understand what is required. For example, while one student already understands, the other is still struggling to grasp the whole concept. Then, we have to explain all over again”. MSIAT3 claimed that “for now, I get them to cut and paste, after that only do they edit and rewrite the essay ... and if they do copy, they need to make sure that it is referenced”.

### 7.4.6 Presentation Stage

In the sixth stage of the search process, students prepare to write and submit the assignments. Normally, the teachers gave one assignment a week in class, but a group project would take longer than that. As MSIAT10 explained: “If we follow the schedule, it is about once a week. But because it is a project, I encourage students to use the Internet at home. In addition, it also depends on the Year 5 class. For example, the class I teach, Year 5, there are some students who receive homework via email, and they can return the homework via email too. That allows me to check their homework from home. Most Year 5 students already have email accounts”. However, MSIAT3 claimed that “sometimes the Internet is down, so for those who cannot send the document by email, they can print it out and hand it in at the end of the class session or save it on the thumb drive.”

For Malay Language teachers, the assignments were normally online exercises provided on the Internet by other teachers from different schools. It was more likely to be an exercise for the students to follow what they had learned in the classroom. MSIAT2 explained the process as follows:

Examples would contain comprehension questions, grammar etc. For example, if we tried to answer a question on ‘kata majmuk’ [Malay Language subject], notes and questions

accompany it. After that a score appears. When the students have answered all the questions and press the submit button, the students will be told as to the right and wrong answers. The students are then allowed to try again.

## **7.5 Case Malaysia (Interview) Summary**

The present Malaysia case study explores the information-seeking process of primary school children and Table 7.4 shows the thematic analysis based on Kuhlthau's ISP model of six stages from the teachers understandings of the model.

## Teachers' Perspectives of Primary School Childrens' Information Seeking

Kuhlthau's six stages of ISP	Sub-Theme derived from Kuhlthau's model	Malaysian Interview Findings
Initiation	Malay and English Language subject	"is used by Malay language and English teachers because there are specific programs on the computers. Computer literacy for the Malay and English language is scheduled in the timetable for two different times, one hour a week" (MSIAT1).
	Experience and knowledge	"if the students come from a good class, there are usually not many problems because they are used to using the Internet at home" (MSIAT5).
	Student capability & class composition	"it all depends on the student"... [for an advanced student,] "We give them one title/topic, and ask them to write an article as well as seek out additional information such as pictures etc." (MSIAT3).
	Familiarity	The students are familiar with Google. All they do is type in the word. For example, for a Malay language grammatical question, all they have to do is type 'Year 5 Malay language grammar questions' (MSIAT4).

## Teachers' Perspectives of Primary School Childrens' Information Seeking

Kuhlthau's six stages of ISP	Sub-Theme derived from Kuhlthau's model	Malaysian Interview Findings
Selection	Search engine used	<p>"I search on the Internet and make sure the students all use the same site. Yahoo! only. If we use too many sites, we do not achieve the same standards. So we standardise" them (MSIAT2).</p> <p>"used the usual search engines such as Yahoo and Google: "I'll ask them to type things that they want to search, for example the image of a bougainvillea. Just type the word of bougainvillea and type image, then search. That's all" (MSIAT9).</p> <p>"I teach them the basics. For example, how to type caps [capital letters]. They have yet to develop their skills" (MSIAT2).</p>
	Keywords based on class level	
	English Language (Translation/meaning)	<p>"All the students would be reading the same story, and we will discuss the difficult words using the dictionary. Their typing skills are also a little slow [Year 2 and Year 4]. There are even students who do not know words that have the same meaning" MSIAT10).</p>
	Images, video clips and songs	<p>"when I showed them the 'starfall' website, they did not move from their chairs and were so engrossed because the website was interesting (MSIAT5).</p>

## Teachers' Perspectives of Primary School Childrens' Information Seeking

Kuhlthau's six stages of ISP	Sub-Theme derived from Kuhlthau's model	Malaysian Interview Findings
Exploration	<p>Reading and spelling</p> <p>Picture and images</p> <p>Sites selections</p> <p>Evaluate and judge it</p>	<p>"So I encourage them to read as much as possible. It is now the reading age, if they do not read, they will be left behind. We learn new things from things we don't know" (MSIAT7).</p> <p>"Once they on their computer, they'll like to go to the school web where there's a lot of pictures. They'll explore that particular web only. They'll pick at random. There's a long list there but they'll choose the first few" (MSIAT10).</p> <p>"So we have to explain it to them and select the best option. We have to tell them to check each search result and look for the information that they need. The weaker students are often confused as to the best option available. We have to help them analyse the information that is needed" MSIAT8).</p> <p>"If the article is too difficult, to change to another. Because I don't have time to go through them one by one. So I tell them that they have to skim through the article" (MSIA3).</p>

## Teachers' Perspectives of Primary School Childrens' Information Seeking

Kuhlthau's six stages of ISP	Sub-Theme derived from Kuhlthau's model	Malaysian Interview Findings
Formulation	Credibility of the authors	
Collection	Editing  Copying, cutting and pasting  References	<p>"we give the students the resources and all they have to do is edit. So they have lesser steps to follow. For weaker classes, they just copy. Because if we ask them to search for information, they do not know how to find it." (MSIAT8).</p> <p>"for now, I get them to cut and paste, after that only do they edit and rewrite the essay ... and if they do copy, they need to make sure that it is referenced" (MSIAT3).</p>
Presentation	Electronic (Email & Blog)        Save in thumb drive  Printed	<p>"there are some students who receive homework via email, and they can return the homework via email too. That allows me to check their homework from home. Most Year 5 students already have email accounts" (MSIAT10).</p> <p>"sometimes the Internet is down, so for those who cannot send the document by email, they can print it out and hand it in at the end of the class session or save it on the thumb drive" (MSIAT3).</p>

<b>Kuhlthau's six stages of ISP</b>	<b>Sub-Theme derived from Kuhlthau's model</b>	<b>Malaysian Interview Findings</b>
Assessment	Checking through online assessment	"the assignments were normally online exercises provided on the Internet. When the students have answered all the questions and press the submit button, the students will be told as to the right and wrong answers (MSIAT2).

**Table 7.4: Thematic analysis of Case Malaysia from teacher perspectives**

## **7.6 Summary**

The interviews with Malaysian and Australian teachers provide insights into the information-seeking activities of primary school children through the Internet. The information-seeking processes were investigated based on Kuhlthau's six-stage model. From the teachers' perspectives, the Internet provided up-to-date and current information for the primary school children; however, due to their limited skills and knowledge, lack of comprehension and literacy skills seeking information from the Internet may be a challenge to the children and teachers. Teachers from both countries believed that actions, thoughts and strategies are important to children's information seeking from the Internet. Table 7.5 shows the thematic analysis based on Kuhlthau's model for both countries.



## Teachers' Perspectives of Primary School Childrens' Information Seeking

<b>Kuhlthau's six stages of ISP</b>	<b>Australia</b>	<b>Malaysia</b>
Initiation	All subjects Freedom for student Experience and knowledge Research skill Reading skill Motivation Problem solving Familiarity	Malay and English Language subject Experience and knowledge Computer facilities Student capacity Creativity Class composition Familiarity
Selection	Search engine used Keywords Spelling Search results list Internet safety Information provider Demonstrate at board Knowledge	Search engine used Keywords based on class level Reading and Spelling Search results list Sites selection Experienced and hardworking Images, video clips and songs English Language (Translation/meaning)
Exploration	Trustworthiness of sites Subject knowledge Reading and spelling skills Sites selection Scan Information	English Language proficiency Skimming information Reading and spelling Sites selection Picture and images
Formulation	Restructuring the information found	Credibility of the authors Relevant Website
Collection	Copying of information Filtering Rewording Summarizing Compile	Editing Animation Summarizing Referencing Copying, cutting and pasting
Presentation	Format presenting the information Plagiarism References Presentation & Discussion	Electronic (Email & Blog) Save in thumb drive Printed
Assessment	Reward such as free time and playing games	Checking through online assessment

**Table 7.5: Thematic analysis of Case Australia and Case Malaysia from teacher perspectives**

The next chapter provides a detailed discussion about the findings derived from the quantitative (survey questionnaires) and qualitative (observation and interview) research. Cross-case analysis findings involved for both countries, Malaysia and Australia, are discussed in order to answer the research questions.

## **8 Discussion**

### **8.1 Introduction**

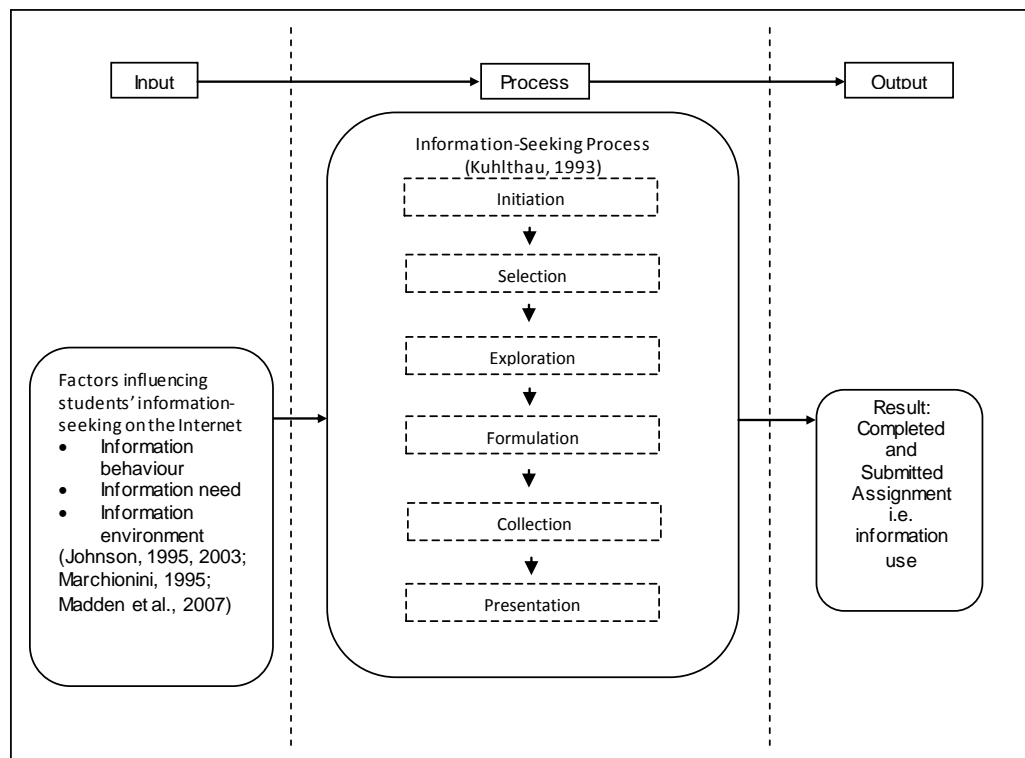
This chapter provides a detailed discussion of the key research findings presented in Chapter 5 (primary school children's surveys), Chapter 6 (primary school children's observations), and Chapter 7 (teachers' interviews). The discussion will explore the information-seeking processes of primary school children in Malaysia and Australia with reference to each research question. In answering the research questions, this chapter discusses the cross-case analysis and thematic analyses from Case Australia and Case Malaysia for each data collection phase, namely the observation analysis and interview analysis, and triangulates the results with the quantitative findings from the survey analysis. It also highlights the results of the study in relation to previous research studies. Based on the findings, the discussion in this chapter focuses overall on addressing the questions of "What are the processes undertaken by school children when searching for information for academic purposes from the Internet?" and "What are the success factors and challenges that primary school children face when searching for information from the Internet for academic purposes?"

### **8.2 Research Context of Findings and Discussion**

This study aimed to understand how primary school children from Australia and Malaysia used the Internet in the information-seeking process for academic purposes. In addition, this study explored the factors and challenges impacting on information-seeking process perspectives in both countries. Primary schools in both Australia and Malaysia have experienced significant change in the teaching and learning processes, and use of ICT as the Internet has become embedded in the curriculum as an alternative to traditional methods. Therefore, this study explored how primary school children sought information through the use of the

Internet in the school setting. The research focused on the challenges to becoming effective searchers and successful in seeking information from the Internet faced by primary school children.

In this study, the conceptual model was developed based on the literature and adapting Kuhlthau's model (1993), as shown in Figure 8.1. This model identifies six stages in the information-seeking process: initiation, selection, exploration, formulation, collection and presentation. In this study, the children's information-seeking processes using the Internet in each stage were explored. Kuhlthau (2008) argued that the important role of information-seeking in the twenty-first century is the use of information for problem solving, not using the technology to search for information. Nevertheless, the ability of primary school children to seek information from the Internet needs to be highlighted as an important issue since children are exposed to voluminous information and a variety of sites that they are not familiar with. In this situation, primary school children face difficulties in accessing and searching for the right information to solve problems or to complete the tasks given by teachers. Students also tend to rely on the Internet, television, or other primarily visual information sources as the preferred source for their information-seeking (Weiler, 2005). Understanding children's information-seeking processes from the Internet may contribute to better strategies in the teaching and learning process. As shown in Figure 8.1, this conceptual model identifies information behaviour, information need and the information environment as factors relevant to information-seeking process.



**Figure 8.1: Adapted Information Search Process**

(Kuhlthau, 1993)

This model predicts that the information-seeking process will give effect to a successful result; that is, that school children will manage to complete the task or assignment given. However, the information-seeking process does not stand alone in contributing to this success. Success is related to another three important factors as an input, namely, information behaviour, information need, and information environment. The output is information use as primary school children use the information to produce the completed assignment successfully.

The aim of this research was to explore the information-seeking process of primary school children using the Internet for academic purposes from Australian and Malaysian perspectives and experiences. The research questions and objectives are recapped as follows.

### **8.2.1 Research Questions**

This research focuses on two main questions:

1. What are the processes undertaken by school children when searching for information for academic purposes from the Internet?
2. What are the success factors and challenges that primary school children face when searching for information for academic purposes from the Internet?

### **8.2.2 Research Objectives**

The objectives of this research are:

- To identify the processes undertaken by school children when searching for information for academic purposes from the Internet.
- To identify the success factors and challenges that primary school children face when searching for information from the Internet for academic purposes.

This research adopted a mixed methods approach, in which the first research question was addressed through a qualitative study and supported by quantitative study.

## **8.3 Cross-Case Analysis: Observation and Interview findings**

In answering this research question, Kuhlthau's information-seeking stages of initiation, selection, exploration, formulation, collection and presentation were adapted to address information-seeking processes using the Internet among primary school children in Australia and Malaysia. The findings were used to extend Kuhlthau's model of information search process (Kuhlthau, 1993) derived

from the cross-case analysis of the qualitative research, namely observations of children and teacher interviews.

### **8.3.1 Cross-Case Analysis: Interpretations from Observation of Students' Information-Seeking Processes**

The findings discussed in this section reveal the patterns or trends in the information-seeking processes of primary school children using the Internet for a school assignment in a school setting in Malaysia and Australia. The findings are presented as part of the qualitative findings from observation. The findings are presented in two ways. First, a qualitative analysis of the information-seeking processes of students is presented in accordance with the six stages of Kuhlthau's model: initiation (information need and knowledge identification), selection (using or selecting Web search engines), exploration (reading content), formulation (evaluation of relevant information), collection (selection and collection of the best information) and presentation (presentation of the best answers). From the observation findings, it appeared that before students sought information from the Internet, children identified the problems or questions being asked in the task and made up the topic selection. At this moment, students mentioned how they felt in relation to their motivation and feelings towards the task given. They then moved on to the next information seeking process of keying in the terms or keywords selected and their website selection. The next stage the students had to choose the best sites selected for them to collect their answers for the task. The final task involved presenting their answers, either in images or text.

Second, the discussion presents a quantitative analysis of the observations, using tables and charts that illustrate the profiles to support the patterns revealed in the qualitative findings on the information-seeking processes by primary school children.

For the purposes of this observation, the population was reduced from 123 to 57 from both countries, due to time constraints. One participant was excluded because she did not attend the one-to-one session with the researcher, as she was

absent from school. The age of the participants was 10 to 12 years. Twenty-nine were female and 28 were male. For the observation sessions, an average of 20 minutes was made available in each session to see the patterns of primary school children's information-seeking processes.

#### **8.3.1.1 Problem Identification and Topic Selection**

Before the students started seeking information on the Internet, they were asked whether or not they understood the task given to them and the topic related to the task. Table 8.1 shows the responses from the participants. Among the 57 students, 53 understood the task given and four students did not understand the questions. Within the classroom, before the students start seeking information from the Internet, they should understand the task given to them and what type of subject information they should search for.




At this stage, the students identified the topic or subject information required from the task given or questions provided. During the observation of the students, the think-aloud protocol was used. The majority of the students (53 out of 57) identified and understood the questions and the subjects to which the information was related such as Science, Pollution, Transport, Integrated Study and History. One of the students (AUS2) said, as the related subject was Mathematics that he understood the questions and topic area; however, Mathematics was not the correct area. It seems that he was the only student who said he understood the task but in fact did not understand it correctly. One of the students was not sure about the topic area and needed the researcher to explain the task. Two other students who were from Malaysia made a guess: since the task was in the English language, they guessed it was about spelling.

#### **8.3.1.2 Motivation and Feeling**

After describing their understanding of the task given, the students reported their feelings at this stage, with 17 of them feeling confident, 14 of them feeling normal, and 26 feeling nervous as shown in table 8.1. As one of the students said,



“I always nervous on test”. Out of the 26 students who were nervous, 20 of them were from Malaysia. This may reflect the examination-based curriculum of the Malaysian education system. The students were also motivated to do the task if they thought they would receive something in return. In this case, they became excited to do the task. For example, MSIA4 asked what she would get if she knew how to do the task. Motivation is one of the elements that influences the information-seeking behaviour of a researcher or user. Kuhlthau (1993) identified motivation as an important element in information science research. Kuhlthau (1998) also recognised that, at the exploration stage, students have less motivation as they faced difficulty encountering information that was irrelevant and did not match their inquiry. However, from the observations conducted in the present research, it seems that uncertainty is useful to stimulate students’ curiosity and interest to know about the topic that they are researching. According to Wilson et al. (2002), uncertainty is due to lack of understanding. However, from the observations conducted in the present research, it seems that uncertainty is useful to stimulate students’ curiosity and interest to know about the topic that they are researching. Therefore, uncertainty may motivate students during the research process, however too much uncertainty and insufficient guidance will likely cause frustration. Another factor that motivates children’s information-seeking processes is their familiarity with the subject or task involved (Wildemuth, 2004). Primary school children seem to be confident if they know about the subject matter or related topic. For example, for task 3 in this study, most of them were familiar with places of interest in their country, and they ended up answering it based on their own knowledge and experience. This is because they already knew the places. For their information-seeking processes, they directly typed the names of the places without searching for the answer from the Internet.

Stage	Results	Malaysia	Australia	Observations
Initiation  Student identifies the problems, has feelings of uncertainty and a need for information	Understand the task			Find information from the Web and pictures from images  Read the task  If I know the answer, should I look for it from the Web  Some students need explanation and guidance  Nervous on test
	Yes	28	25	
	No	2	2	
	Topic Selection:			
	Pollution	0	3	
	Science	14	1	
	Environment	0	3	
	Transport	0	9	
	Safety	0	1	
	Integrated Study	5	3	
	Geographic	1	1	
	Mathematic	0	1	
	English	7	1	
	History	1	3	
	Spelling	2	0	
	Not sure	0	1	
	*Feelings:			
	 Confident/Happy	7	10	
	 Neutral	3	11	
	 Sad/Frustrated	20	6	

**Table 8.1: Observations of information-seeking processes at the initiation stage**

\* Face symbols used by the children to express their feeling.

### 8.3.1.3 Primary School Children's Subject Knowledge and Experience

The topic selection or subject information was related to the students' knowledge and experience. According to Weiler (2005), students seem to favour the knowledge collected through their personal experience or from talking with others about their personal experience, rather than through information sources available, such as research studies or statistics. In the present study, the students seemed to use their own knowledge and experience in order to seek information from the Internet, or to complete the task without using information located using the Internet. For example, in relation to task 3, the students from both Malaysia and Australia were asked about interesting places based on their own experience and directly applied their knowledge in order to solve the task. Among the Malaysians, MSIA4 said, "In Malaysia this is the most interesting place to visit. I went there before with my father and mother". The students mentioned that they learnt from their parents or friends in finding and using certain search engines. MSIA4 added, "This is easy, because I always watched my dad doing this when we going for a holiday". Students MSIA2, MSIA5 and MSIA6 already identified the best place and straight away typed the places that they knew and sought the information related to those places. Meanwhile, AUS18 after six attempts was still unable to retrieve any related information from the Internet; he answered the task based on his knowledge and felt lucky as he knew the answer. This situation also happened to AUS7, whereby after the fourth attempt she said, "It is ok, I learn this and know the answers". In regard to selection, the students shared a common ground in choosing the search engines used.

### 8.3.1.4 Search Engines Used

The students from both countries reviewed their navigational skills during their information-seeking process when using the Internet. The majority of them used Google as a search engine, followed by Yahoo, Direct search, Safesearch and Bing, as shown as Table 8.2. Google was the primary search engine that they used to begin their searches. Out of 57 students, 27 used Google. According to Xiang

and Gretzel (2010), Google serves the largest percentage of queries (approximately 47.3%) on the Internet and is highly popular among Internet users including students (Haigh, 2006). Haigh (2006) contended that people chose any search engine that offered a vast volume of information. Some students' Web search engine selection was influenced by their experience and knowledge as taught by parents, teachers, siblings or peers. This was indicated by the quantitative findings whereby twenty-four school children (35.82%) from Malaysia reported that their parents assisted them when using the Internet and in Australia, twenty-five school children (44.64%) reported getting assistance from their teachers. However, two students in Malaysia navigated to the default homepage, [www.lenovo.com](http://www.lenovo.com), and for both these students, the search ended in frustration. Surprisingly, none of the students chose the school education link provided by the Ministry of Education in Malaysia or the Department of Education & Early Childhood Development in Victoria. This finding indicates that students tend to use popular search engines as a major source for their information-seeking processes.

The next step taken by the school children was to develop their search terms. AUS12 claimed that he knew what words to type or search for based on the questions or the title of the task given:

“First of all go to Google.com and type pollution as in question asked. Now you see it will appear like this and you have to choose one of the following search results.”

The students understood that in order to find information they would normally go text sites, and for pictures they would go to images. For example, AUS21 began her search with a direct search using Google.com and typed “types of modes of transport”. However, there was a different scenario in Malaysia, where some of the students had difficulty in understanding the English language. Most online resources are in the English language and this forms a barrier for them as English is their second language. MSIA1 stated, “I learned this from my teachers as she said that if I do not know about something, just search the definition from

dictionary”. He copied and pasted the definition of “transport” into a Word document. MSIA10 did not understand the task given to him due to the English language. He began his search with Google.com and typed “jenis kenderaan” in the Malay language which means “type of transportation”. It was necessary for me to explain and translate it for him.

#### **8.3.1.5 Initial Search Terms and Keywords**

Most students from both countries were able to identify search terms and this is a key step in the information-seeking process. The students were given one task based on their level of study from these three topics: pollution, transport and interesting places. Table 8.2 shows the search terms that were used by the students, based on the notes taken by the researcher during the observations. Students who used the right search terms were led to the relevant sites and were able to retrieve appropriate information to complete the task. Students who had a poor understanding of the task seemed to feel nervous and confused. As a result, they felt lost, did not do anything or used irrelevant terms or typed wrongly spelled terms for the search terms.

Most of the students used words from the questions as a search term or keyword. The spelling of search terms was generally a problem for some of the students. Some of them asked me the questions such as: “How to spell pollution?”, “Please give me a clue on how to spell this”, and “Does it matter if I write wrong spelling?”. One student stated, “I am bad in spelling?”. I guided them and gave clues to some of them; however, many of the students who did not ask for help encountered misspelling errors. The students had a problem in typing, spelling, vocabulary skills and no students in this study used Boolean logic skills. The majority of the students could identify the keywords from the questions and some of them simply typed the whole question in the search box and waited for the results to appear. This appears to be consistent with the finding by Nessel (2009) that students using electronic resources had difficulties in planning and constructing the right keywords compared with their experience using non-electronic resources.

The observations showed that as well as the students' low literacy in spelling, not using the space bar also had a consequence for finding information from the Internet and led them to get different results. This common mistakes were made by a number of students in searching for information from the Internet, as shown in the following examples:

- Student 1: TYPE: www.good girl.com. [Google]
- Student 2: TYPE: what is polluton? [what is pollution]
- Student 3: TYPE: pullution? [pollution]
- Student 4: TYPE: Stats in Australia [States in Australia]
- Student 5: TYPE: States Palces [States Places]
- Student 6: TYPE: Trans [Train]
- Student 7: TYPE: statsinplaces [states in places].

Those who used Google as a search engine attempted to correct the search terms as per the “Did you mean?” prompt provided by Google. By clicking on the provided options, the students could get a list of results. Meanwhile, students who used other search engines had to use the back button and refine the search terms. Several students had difficulty deciding what term to type in the search box. For example, MSIA12 said, “I usually got help from my teacher”. Another student took about 8 minutes to find the right key terms but ended up in frustration:

1. First attempt: TYPE: ask.com.
2. Second attempt: TYPE: what type of transport is there.
3. Third attempt: TYPE: what type of transport.

I guided her to use Google and type the search terms that related to the questions. Following this advice, she did the following:

1. TYPE: Google.com.
2. TYPE: What type of transport is there.

3. Click 1st: Wikipedia.

Finally, she got the answer, and directly copied and pasted the answer in Microsoft Word.

Stage	Results	Malaysia	Australia	Observations
Selection  Student tries to identify a general topic in order to search for the information	Search engine used:			Open Google
	Google	17	20	Give a clue
	Safesearch	0	1	
	Direct search	2	5	Wrong spelling
	Bing	0	1	Cannot find the right answers
	Yahoo	11	0	
	Keywords used:			Did you mean
	Task 1:			
	Transport			Does wrong spelling matter
	Modes of transport			
	History of transport			Do not know how to search
	Early form of transport			
	Trains			How to spell certain words
	Transport information in Melbourne			
	Type plane, car, boat			Wrong spelling
	Trans			
	Form of transportation			No correction attempt
	Horse and Cart			
	What type of transport is there			Misspelling error
	Trams			
	Boat			Broad concepts
	Information about cars			
	Different transport			Refine search
	Mods of transport			
	Jenis kenderaan			Attempt to correct error by ‘do you mean’
	Three modes of transport			
	3 types of transport			
	Task 2:			

Stage	Results	Malaysia	Australia	Observations
	Pollution			How to spell pollution
	Causes + effects water pollution			
	What is pollution			I'm bad in spelling, read give better answer
	Types of pollution			
	Polution			
	Pollution information			
	Definition of pollution			
	What causes of pollution			
	Poluton			
	Science information for kids			
	Bacteria			
	Science career			
	Pencemaran alam di Malaysia			
	About pollution			
	What mean pollution			
	What is pullution			
	<b>Task 3:</b>			
	The state in Australia			
	Queensland			
	Stats in Australia			
	States in Australia			
	Western Australia			
	South Australia			
	Tasmania			
	Interesting places Queensland			
	Interesting places South Australia			
	States Places			
	States of aberrations list			
	States farm			
	New Zealand			



Stage	Results	Malaysia	Australia	Observations
	List 3 states in Australia			
	Places of Tasmania			
	Places of Victoria			
	States in Malaysia			
	Interesting places in Perak			
	Johor Bharu			
	Pulau Langkawi			
	Search Malacca			
	Where is Malacca			
	A famosa			
	Interesting place in Pahang			
	Interesting place in Melaka			

**Table 8.2: Observations of information-seeking processes at the selection stage**

#### 8.3.1.6 Selection of Sites Used

For the “exploration” stage, the students tried to investigate or search for more information on the topic. All the students showed that they knew navigational skills such as scrolling and clicking on links on the screen. Thirty of the students simply clicked the first result that appeared on the screen. One of the students told me “You no need to see all, usually the first results is the most relevant information that you want” (MSIA11), and another said “First always the best” (AUS21). Students claimed that pictures and diagrams were easy to understand in order to locate information. Fourteen of the students clicked images as pictures would be more easily understood. One student said, “See, it is easy, what you have to do is choose the picture that you like it, copy and paste it back to Word” (AUS21). The students tended to read and select the relevant information by scrolling up and down, following a few links as their search strategies. One of the students (AUS12) told me that it was easy to find information based on the

category and if the text was too complicated it was necessary to refine the search terms or look for other sites. However, some students still had difficulties in finding the right sites due to spelling and reading difficulties, claiming that the articles were too long and were hard to understand. Observations indicated that primary school children may be able to succeed in their information-seeking for learning purposes if the information is provided by category and if they do not have any problems with literacy skills such as reading and spelling.

Table 8.3 shows the sites selected by the students in order to search for information from the Internet and the search results that were clicked. Among the participants, 35 of the students from both Malaysia and Australia chose the Wikipedia website, <http://www.wikipedia.org/>, in order to explore information on the topic. AUS1 claimed that Wikipedia contained everything and was easy to understand – just copy and paste the answer. On the other hand, AUS15 found the information from Wikipedia was difficult to read, however most of the answers for the task given were there. Wikipedia is a “free Internet encyclopaedia, which is written by volunteers around the world, and almost all of its articles can be edited by anyone.” (<http://en.wikipedia.org/wiki/Wikipedia>). Two school children randomly selected the sponsored link to search for information. Sponsored links from AdWords can be seen on the right-hand side of any homepage. For example, on Google, the sponsored links appear next to Google Maps search results. Sponsored links are a form of advertisement as links to websites that pay for placement. These two students attempted to use sponsored links as a simple way to find related websites that may contain the information that they sought. Therefore, teachers should explain what “sponsored links” are.

Stage	Results	Malaysia	Australia	Observations
Exploration  Student uses the search engine to explore information on the topic from the search result selections	<b>Search results:</b>			First always the best
	1st	18	12	Cannot get the answers
	2nd	10	6	
	3rd	2	5	
	4th	0	1	Can I go Images
	5th	0	1	Look and think appropriate answers
	6th	0	1	

Stage	Results	Malaysia	Australia	Observations
	7th	0	1	Scroll down
	8th	0	0	
	9th	0	2	
	Images	5	9	
	<b>Selection sites:</b>			<p>This site is very good</p> <p>Too long article</p> <p>Confusing</p> <p>I don't want to read, it's hard</p> <p>The answers is not here</p> <p>Limited scroll</p> <p>Cannot find right answers</p> <p>Follow link</p> <p>Read and scroll</p> <p>Back Button</p> <p>Scroll up and down</p> <p>If too complicated, refine search or look for a new site</p> <p>Take the information from the map and type list of states in</p>
	<a href="http://www.wikipedia.org/">http://www.wikipedia.org/</a>	14	21	
	<a href="http://wiki.answers.com/">http://wiki.answers.com/</a>	0	1	
	<a href="http://www.metlinkmelbourne.com.au/">http://www.metlinkmelbourne.com.au/</a>	0	1	
	<a href="http://www.australianexplorer.com/">http://www.australianexplorer.com/</a>	0	2	
	<a href="http://www.thestudentguide.com/">http://www.thestudentguide.com/</a>	0	1	
	<a href="http://www.131500.com.au/">http://www.131500.com.au/</a>	0	1	
	<a href="http://www.queenslandholidays.com.au">http://www.queenslandholidays.com.au</a>	0	1	
	<a href="http://www.travelaus.com.au">http://www.travelaus.com.au</a>	0	1	
	<a href="http://freepages.family.rootsweb.ancestry.com/~tcowley/Places/Tasmania.htm">http://freepages.family.rootsweb.ancestry.com/~tcowley/Places/Tasmania.htm</a>	0	1	
	<a href="http://www.places.vic.gov.au/cs/Satellite?pagename=Places">http://www.places.vic.gov.au/cs/Satellite?pagename=Places</a>	0	1	
	<a href="http://www.greatplacestostay.com.au/regional_info_couples.asp">http://www.greatplacestostay.com.au/regional_info_couples.asp</a>	0	1	
	<a href="http://www.visitvictoria.com/">http://www.visitvictoria.com/</a>	0	1	

Stage	Results	Malaysia	Australia	Observations
	<a href="http://www.gold-coast-australia-travel-tips.com/main-tourist-attractions-in-Australia.html">http://www.gold-coast-australia-travel-tips.com/main-tourist-attractions-in-Australia.html</a>	0	1	Microsoft Word
	<a href="http://australia.gov.au/people/tourists/tourism-sites">http://australia.gov.au/people/tourists/tourism-sites</a>	0	1	Easy to find information based on category
	<a href="http://www.australia-trips.info/Destinations/destinations.html">http://www.australia-trips.info/Destinations/destinations.html</a>	0	1	Sponsored link
	<a href="http://www.australia-trips.info/Destinations/Wa/wa.html">http://www.australia-trips.info/Destinations/Wa/wa.html</a>	0	1	
	<a href="http://www.macgregoss.eq.edu.au/qlwebchall/pollution2/index.htm">http://www.macgregoss.eq.edu.au/qlwebchall/pollution2/index.htm</a>	5	0	
	<a href="http://library.thinkquest.org/26026/Environmental_Problems/water_pollution_-_effects.htm">http://library.thinkquest.org/26026/Environmental_Problems/water_pollution_-_effects.htm</a>	6	0	
	<a href="http://www.fascinatingmalaysia.com/index.html">http://www.fascinatingmalaysia.com/index.html</a>	1	0	
	<a href="http://lenovo.com">http://lenovo.com</a>	2	0	
	<a href="http://www.sains.com">www.sains.com</a>	1	0	
	<a href="http://www.melaka.net">www.melaka.net</a>	1	0	
	<a href="http://www.rhta.com">http://www.rhta.com</a>	1	0	

**Table 8.3: Observations of information-seeking processes at the exploration stage**

### 8.3.1.7 Evaluation and Judgment of Information

In the “formulation” stage, the students focus on a specific area within the topic. Again, the majority of them did not fully use this stage. They just typed the entire question into the search box, pressed enter and waited for the search results. Only one student from both countries carried out the steps in the formulation stage by evaluating the information from a few websites before making judgments for information collection. This finding indicates that students did not use any formulation to find information from the Internet and supports Kuhlthau’s model where the formulation stage was found to be the most challenging to the primary school children. (Kuhlthau et al. 2008).

This finding was derived from the observation session, whereby a majority of the students skipped the formulation stage to go directly to the collection stage. This is true where students did not want to explore the information found and evaluate it due to difficulty with understanding the context of information, and their lack of literacy skills. Table 8.4 summarises the key observations of the students’ information-seeking processes at the formulation stage.

Stage	Results	Malaysia	Australia	Observations
Formulation  Student focuses on a specific area within the topic		0	1	Explore a few sites and evaluate the information retrieved

**Table 8.4: Observations of information-seeking processes at the formulation stage**

### 8.3.1.8 Copying, Restructuring and Format of Information

At the collection stage, after reading the search results, only one student gathered and wrote notes about all the relevant information needed from various search results. In total, 59.4% of the students copied, cut and pasted the information found from the Internet. Meanwhile, 15.8% of the students rephrased and




restructured their own sentences, and 24.5% of them were more concerned about the layout of the assignment by formatting the text through the choice of font and emphasis (e.g. bold) and resized the pictures and images taken from the sites. Table 8.5 summarises key observations of the students' information-seeking processes at the collection stage.

Stage	Results	Observations
Collection  Student gathers all relevant information needed	Copy information found from site	Type the answers directly without searching from sites
	Cut information	Open Microsoft Word, write and structure sentence
	Rephrasing	
	Formatting (Bold and Font)	
	Resizing the picture	
		If copying that be cheating
		This is what I normally do, copy, re-do in my own words
		Diagram easy to understand
		Read first, make sense, and copy it
		If definition, I just copy it
		Format and resize picture
		Type in font 18, so teacher can see the answers
		Bold and font
		Restructuring the sentence
		Rephrasing it
		Can I write anything that I know
		Combine it

**Table 8.5: Observations of information-seeking processes at the collection stage**

### 8.3.1.9 Text and Pictures

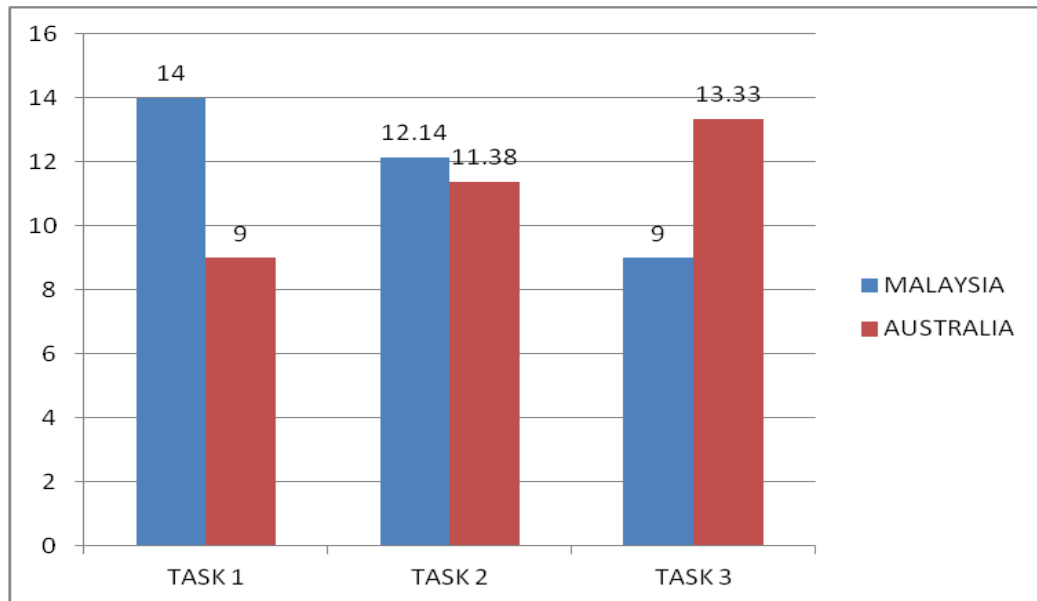
At the “presentation” stage, all the students completed the information search or task. Thirty-two of the students answered in writing, and the remainder attached pictures to the text. As one of them said, “People will more understand the information given with pictures” (AUS21). At the end of this process, students were asked to identify how they were feeling: out of 57 students, 24 of them felt happy as they completed the task, 22 of them felt neutral and 11 of them felt frustration, due to not being confident about the answer given. Table 8.6 summarises the key observations of the students’ information-seeking processes at the presentation stage.

Stage	Results	Malaysia	Australia	Observations
<b>Presentation</b> Student completes the information search	Text	20	12	Gives name to picture and saved Already know the answers and write in the Microsoft Word Save the documents
	Image and Text	10	15	
	<b>Feelings:</b>			
	 Confident/happy	13	11	
	 Neutral	12	10	
	 Sad/frustrated	5	6	

**Table 8.6: Observations of information-seeking processes at the presentation stage**

### 8.3.1.10 Duration of Completing the Task

Figure 8.2 shows the average duration taken by the students to complete the task. The graph shows, where task 1 (pollution) had the highest average duration of 14 minutes, followed by task 2 (transport) at 12.14 minutes and task 3 (about an interesting place) at 9 minutes for Malaysian primary school children. Meanwhile a different scenario happened with Australian primary school children, where task 3, at 13.33 minutes, had the highest average duration that students spent in order to complete the task, followed by task 2 at 11.38 minutes and task 1 at 9 minutes.



**Figure 8.2: Average duration based on task (Malaysia and Australia)**

### 8.3.2 Summary of Cross-Case Observation Analysis

It appears that the students from both countries possessed basic strategies and search techniques. However, their skills in the information-seeking process using the Internet were found to be lacking. The students tended to skip some of the six stages of Kuhlthau's Information Search Process, and the pattern of the search process was revealed to be iterative rather than a linear sequential process. During the search process, the students repeated the activities at various stages of the search process, such as the selection of sites. This showed that the students' information-seeking processes using the Internet were complex when looking for information. This complexity was due to the selection of the search engine, the predominance of English language Internet content, large amounts of information available, lack of knowledge and experience to identify the credibility of sites, as well as problems in reading and spelling.



### **8.3.3 Cross-Case Analysis of Teacher Interviews**

The findings show that, from the teachers' perspectives, a number of important elements should be embedded in the information-seeking processes of primary school children. These elements include topic selection, students' knowledge and experience, lesson plans and student ability, navigation and literacy skills, instruction and guidance, keywords and referencing and plagiarism.

#### **8.3.3.1 Task Objective and Topic Selection**

The main difference in the findings is that it was compulsory for the primary school children from Malaysia to use the Internet for two subjects, namely, the Malay Language and English Language. In contrast, the teachers in Australia encouraged their students to use the Internet in many subjects, and frequently used it themselves to support their teaching and learning processes, especially in completing classroom assignments. There was no specific subject which required, nor restricted, students to use the Internet. Students and teachers had more freedom to choose the topics which interested them. This freedom of choice contrasted with the practice in Malaysia. Freedom of choice allowed students to expand not only their knowledge but also their experience with using the Internet with regard to various fields and areas of study.

#### **8.3.3.2 Students' Knowledge and Experience**

The study showed that the students' knowledge and experience were important elements for information-seeking processes, regardless of what resources were used. This finding is consistent with the views of Barrett (2012) and Wildemuth (2004) who found that the main factor influencing Internet searches by young children is their domain knowledge, and those students with less knowledge about a topic show less competence in their search processes. Furthermore, in the case of Australia where there were no specific subjects that used the Internet, the students were motivated to explore based on their interests and this indirectly enhanced their research and reading skills during the information-seeking process (Susskind et al., 2003). When primary school children are familiar with the

research topic, the difficulty of the search process is reduced (Coiro & Dobler, 2007). As the present study revealed, at primary schools in Victoria, Australia, teachers were given the freedom to choose the subject for which they think it is appropriate to use the Internet to support the curriculum.

The Australian teachers were not worried about their students' use of the Internet when seeking information. As one of the interviewees said:

“[AUST1] grew up with a computer, and about 80% of them have Internet [access] at home as we did a school survey last year [2010] ... Obviously they have great understanding to begin with.”

Children nowadays are “digital savvy”: they have grown up with computers and technology and have basic skills in using a computer, especially the children who have a computer with Internet access at home. Prensky (2001) described these young children born in the digital age as “digital natives” who think and process information in a fundamentally different way to “digital immigrants”. The digital immigrants are those who were not born in the digital age and who have to accept and adapt the technologies into their environment. Digital natives are used to receiving and processing information faster and tend to multi-task in managing the information. This helps them to improve their reading and spelling skills.

Teachers in Malaysia have to teach based on the syllabus provided by the Ministry of Education, Malaysia. The classroom sessions for the Malay and English Language subjects are followed by the computer literacy class session in the computer lab to further explore the topic by using the Internet. As uncovered in the interviews, the teachers' main issue was the students' capability to understand the topic area to search the information. The teachers in Malaysia also agreed that the students who used the Internet at home normally did not have as many problems seeking information from the Internet but they still needed proper guidance. As one of the teachers said, no matter how clever they are, the students still need guidance:

“I usually give them the topic. I will tell them the topic that I need. Sometimes I will tell the students that the topic is hard, so I need to explain and make things clearer. For example, elements for avoiding a road accident. What are the elements? The reasons. So, if the students type in ‘elements’ and do not get an answer, then can they try typing in ‘reasons’ or ‘causes’. I give them alternatives. This makes it easier for the students to understand. If too many suggestions arise, that too causes confusion.” (MSIAT3)

### **8.3.3.3 Lesson Plan and Student Ability**

Malaysian teachers have to prepare a lesson plan to teach different techniques and skills for seeking information from the Internet to cater for the different ability of students. For example, a teacher has to write the steps of seeking information from the Internet on the whiteboard, in order for the students to successfully seek information and complete the task. One of the long-serving Australian teachers agreed that, normally, if she planned to give an assignment to her students, she would explain the subject matter to them. For example, if the topic was Australian frogs, she asked them to read through books and other printed resources on the topic. This allowed them to understand the subject matter, including a clear description and pictures, prior to attempting to look for information on the Internet. This approach is consistent with the finding by Prensky (2001) that young children preferred graphics rather than text in seeking information from the Internet.

Another important finding is that, due to the differences in the education systems in Australia and Malaysia, students were treated in different ways. The Malaysian education systems practise an examination-oriented approach, and the classroom composition is based on the students’ examination results, with different classes for students with different abilities. The teachers reported that the students’ ability and level of thinking influenced their information-seeking skills. The Malaysian teachers said they had to identify the students’ skill levels before assigning tasks.

Normally, students who had higher skills, and who had a computer with Internet access at home, did not have as many problems compared to others. The teachers assigned different tasks based on the students' skills. If students came from a weaker class, teachers gave simpler tasks, which were more entertaining and contained more pictures and images to help them better understand the learning topic.

In contrast to the Malaysian situation, Australian teachers explain the subject matter before students go and search for the topic by themselves. For example, when the students were learning about Australian frogs, "I asked them to start by first reading about frogs. This allowed them to understand the subject matter prior to attempts of looking for information on the Internet" (AUST6). AUST3 stated that "the more they use the Internet, the more they understand how to seek information from it and with good literacy skills this will also help them, especially in spelling and reading".

Different teachers have different styles of showing the children how to use the Internet as an information-seeking tool. Some teachers in Australia show the appropriate URL address on the "smartboard" and all the students will follow this direction. Both ICT teachers reported in the interviews that they often teach the children skills for seeking information on the Internet. AUST6 reflected, "I teach the students skills, and introduce them to the various resources. I also teach them about Internet safety [which is part of the Australian Government requirement], how to use Internet Explorer and buttons such as the address bar, and how to insert the URL address".

#### **8.3.3.4 Navigational Skills and Literacy Skills (Reading and Spelling)**

Teachers from both Australia and Malaysia considered that the students' ability to read, spell and navigate was important throughout the information-seeking process. The Malaysian teachers emphasised that the use of the English language proficiency was important for Malaysian primary school children in using the

Internet to seek information. In general, Malaysian teachers perceived that the teaching of the Malay language via the Internet was ineffective. This was due to a number of critical factors; one of them being that there were no relevant sites developed for the purpose of teaching the language online. Although the teachers should follow the syllabus given to them, they had to identify appropriate search engines prior to the subject or topic to support their teaching processes. This was because the Ministry of Education did not provide relevant search engines to support the syllabus. As a result, teachers individually struggled to explore, compile and plan relevant content material for their students. Figure 8.3 shows a screenshot of the “Teacher.Net” website, known in the Malay language as “Cikgu.Net” (<http://www.cikgu.net.my/>). Teachers can become a member of this site to share knowledge, ideas and experience. The members upload relevant exercises and sites to be shared with other teachers by linking to their personal blogs. Most of the blogs contain information about the subject that they taught together with the exercises. There are also links to school websites, latest news about education and forum discussions. This includes the latest news from local newspapers, particularly news related to education. Members can also give comments and feedback through the information and articles published in the forum. Overall, the members can use the site to exchange ideas and knowledge interactively.

In Australia, teachers agreed that some of the students did not know what to do and these students required guidance from a teacher who sits beside them and teaches them step by step. AUST3 explained that even though the use of Google, Yahoo Kids or Safe Search was demonstrated to the students, some of them forget the procedures. Teachers have to show the students individually or in small groups. Teachers encourage students to gather as much information as possible from the Internet; to open more than one site and scan the information in order to get the best and right answers for their assignment. The more they use the Internet the more they understand which search results are the most appropriate. This reflects Kuhlthau’s formulation stage; however, only one student in the study truly operationalised the formulation stage. Teachers also deal with the

challenges for the students to get correct spelling : “often I have to write the word on the board and, aside from spelling, the students find inappropriate content or content that is hard for them to understand” (AUST5); “if the students cannot spell or spell the website wrongly, they will obtain incorrect answers” (AUST8). During the search process, teachers sit with the school children and guide them to relevant sites where the text will be more at their reading and comprehension level. Australian school children seem to have the same difficulties in reading, spelling and literacy skills as Malaysian school children. Australian primary school children said (from survey questionnaires) that the main challenge was lack of skills in searching for information from the Internet. This is due to the students’ profile in the Australian case, 58% and 50% from both schools were from a language background other than English language. Both schools having a multicultural population of Middle Eastern, African, Indian, Chinese, Vietnamese and Indigenous children.



**Figure 8.3: Cikgu.Net**

(<http://www.cikgu.net.my/>)

### 8.3.3.5 Instruction and Guidance

For Malaysian teachers, in order to ensure that teaching is in accordance with the syllabus, the teachers have to find the right topic to be searched on the Internet. However, teachers stated they have found that the ability and level of thinking of the students influenced their Internet information-seeking skills. As explained previously, the teachers had to identify the students' skill levels before assigning tasks and they had to provide guidance regardless of which class the students were in. This situation occurred mainly for the teaching and learning of the Malay language, for which the teachers found few suitable websites or online materials for the subject. As a result, the teachers and students had to rely on software created by private companies, which was often obsolete and out-dated by the time it reached the schools. Sites relevant to learning the Malay language were very limited, as their creation depended on the efforts of Malay language experts or other teachers. The teachers had to be very selective in order to access appropriate sites for the students, specifically sites with relevance to the syllabus. In Australia, teachers claimed that some students already have great skills and know how to scan and judge the information found; these students only need minimal guidance from teachers.

With teacher guidance, students managed to achieve the targeted objectives and retrieve all the related information. Malaysian teachers usually asked the students to look up Yahoo!, type the search details, and follow the suggestions that appear. The teachers normally suggested the keywords to the students. The teachers went around the class and discovered that the advanced students tended to explore various types of articles that can be added to the search, while the weaker students did not know how to read the information found on the Internet, their typing skills were also slow and some did not know the meaning of words. In order to give attention to this kind of student in the class, the teachers had to find interesting websites such as those that had pictures, songs and video clips. From there, the students could learn about the various topics.

In the exploration stage, the teachers found that the students needed to be good at reading and spelling; they needed to possess a certain amount of general knowledge about the subject, and know how to judge and assess the trustworthiness of the sites found or used. Since students have various skill levels, the teachers needed to demonstrate how to use the Internet and make suggestions for the search terms. Teachers also needed to teach the students that the first results of a search may not necessarily be the best. Students needed to develop the capability of reading the information found from an Internet search and scan it for relevance in completing their assignments. The teachers believed that the students' subject knowledge was very important for them to identify the information needed in their assignment. The teachers explain the subject and context clearly and make sure the students understand prior to attempts at looking for information on the Internet. The teachers introduced their students to the need to look for trustworthy Internet sites and consider the credibility of the authors. Information that is produced officially by an individual, organisation or government website also needs to be assessed to ensure that relevant, accurate, timely and concise information is obtained.

The teachers encouraged their students to discover as much information as possible before they collected/retrieved it. Normally, weaker students had difficulty checking information located to get the best option. Again, this was not only about reading skills; rather, the content of the information reflects the students' level of understanding. The teachers from both countries had to plan and choose simpler sites, and in selecting the search results the teachers guided the students to pick the first few ones as they claimed they contained the best answers.

In Malaysia, since there were limited sites for the Malay Language subject, the teachers sometimes asked students to search for a Malay topic on English sites. This strategy might have confused the students, especially those who were not fluent in English. Some students were excited to explore the information and tended to go beyond the original task, including to overseas sites. They were supposed to read as much as possible, to learn new things and to complete the



assignment. While reading, the students discovered new knowledge from the information they found. However, students liked to explore particular sites and were more excited to view images. They picked at random and chose the first few sites to complete the assignments.

As a consequence, many Malaysian students were unable to seek information effectively from the Internet. In Australia, the teachers did not face this kind of problem except in relation to research skills, where they found their students to be lacking. Even though the teachers demonstrated the use of Google, Yahoo Kids or Safe Search, some of the students forget the procedures and had to be guided personally (one by one). This situation was not so much of a problem for Australian teachers as the number of students per class was around 15 to 20 students, compared to Malaysian teachers who had around 45 students per class. Furthermore, the Australian teachers had been provided with a “smartboard” (linked to the Internet) in each class which they could use to demonstrate directly to the students in the class.

From the teachers’ point of view, after the exploration stage, students directly move on to the collection stage. Often, students skipped the formulation stage. This may be because they may be unable to fully formulate effective information-seeking skills and they did not have patience for the process. As one teacher explained, they “want to finish quickly, and are satisfied as long as the assignment is completed” (AUST5). Teachers from both countries agreed that the formulation stage is less of an issue as student tends to explore and collect directly whatever information found from the Internet to complete their assignment or task.

Malaysian teachers gave specific instructions to the students that they need to filter, reword or construct their own information before submitting or presenting their assignment. In this stage, again teachers guided their students to complete the assignments based on their ability. Some of the teachers obtained articles from the Internet and allowed students to edit and summarise the articles, while weaker students copied the articles. The reasons behind this course of action included time constraints and the number of students in a given class. For example, the

teachers had to teach an average of 36 students in one hour and each student needed about 5 to 10 minutes for attention and completion; there was not enough time in one session. Therefore, the teachers had to take smaller steps in guiding the students to complete the assignments. In addition, two students had to share one computer; even if one student already understood, the other may still struggle to grasp the whole concept. Australia teachers normally explain the assignment before asking the students to search for information from the Internet. Teachers mentioned that if the students copied directly from the Internet they need to make sure that it is referenced. Some of the teachers guided the school children at this stage and told them to save the information found first before they answer the assignment. This made it easier for them to understand the information found and then summarize it.

#### **8.3.3.6 Keywords**

Another finding that was similar in the Australian and Malaysian cases was that teachers from both countries recognised two main elements that were important to the students: the search engine used, and the keywords and spelling. The teachers claimed that in order for students to be able to search for information on the topic, the teachers first had to explain the research task, scope or focus, in order for the students to know the right search engine that could give them the best answers. Nevertheless, some teachers gave students the freedom to select the search engine they used. The teachers found that keywords were an essential and critical element in seeking information. According to Prensky (2001), children preferred to randomly access information without constructing the search term or keywords. Students needed to choose the right keyword, and be able to spell it correctly in order to ensure that they were able to identify or retrieve relevant information.

#### **8.3.3.7 Referencing and Plagiarism**

In the presentation stage, the teachers expected the students to submit the assignments based on the requirements given, and one of the requirements was to make a list of references. The teachers preferred their students to collect as much

information as possible, copy, cut and paste, and later edit and rewrite in order to complete the assignments. Students who copied information from the Internet had to make sure that it was referenced. At the same time, the teachers had to remind the students not to plagiarise other people's work. If they copied the information, they needed to quote it and make references. This was done to educate them about plagiarism.

In Malaysia different class levels are allowed different methods for submitting their assignments. For students in Grade 5, the teachers allowed them to return the homework via email if they did not finish it in class, and some of them printed it out and handed it in at the end of the class session. Some of teacher also would prefer to discuss it openly through blogs. It was a different scenario with the Malay Language subject, whereby the assignments were normally given online. The students were required to answer all the questions and submit the assignment instantly online. Students immediately obtained the answers through an online system, and thus they automatically completed the assignments. As for Australia teachers, most of the assignments were discussed openly, where the students presented in front of the class and everyone can exchange their ideas and the teachers becomes a moderator. However, teachers from both countries agreed that they should assess the assignments so that student will take the task more seriously. Currently, teachers give free time and rewards if the students complete the assignment regardless if is correct or not. For Malaysian teachers, especially for Malay language subject, students get direct assessment through online checking systems.

### **8.3.4 Summary of Cross-Case Analysis of Teacher Interviews**

In conclusion, the present case study adopted Kuhlthau's model of ISP (1993) and aimed to describe students' information-seeking on the Internet from the teachers' perspectives. The case studies indicated that the teachers focused more on the actions associated with information-seeking processes that were most relevant to learning; that is, on actions such as how to use the Internet, and how to synthesise, organise and evaluate the information found. In this context, the teachers

integrated information skills, technology and network literacy to guide students when seeking information from the Internet for academic purposes.

Teachers in both countries found that the students' ability to read, spell and use the English language was important for primary school children when they sought information on the Internet. The teachers had to guide the students based on their ability and level of thinking and collaborate with the teacher librarian to enhance information-seeking skills. The Malaysian teachers further explained that there were limited sites that were suitable and relevant for primary school children, especially for the Malay Language subject. Factors such as time constraints, lack of computer facilities, network accessibility and information-seeking skills using the Internet caused challenges or difficulties in students' learning process for seeking information on the Internet. In contrast, Australian teachers seem not to worry so much about children's abilities in information seeking from the Internet because they get assistance in developing information literacy skills to the students from teacher librarians and literacy teachers.

Based on the findings of this research, it can be identified that the students skipped the formulation stage and directly moved to the collection stage and later submitted or presented the assignment. This process differs slightly from Kuhlthau's model of ISP.

#### **8.4 Cross-Case Thematic Analysis (Australia and Malaysia Cases)**

The present case study investigated how primary school children sought information from the Internet for academic purposes. The following findings are based on the observations and interviews carried out as a means of data collection. Utilising a cross-case analysis of two case studies, this section discusses the categories and concepts of the information-seeking process based on Kuhlthau's theoretical model that developed information-seeking in six stages: initiation, selection, exploration, formulation, collection and presentation. The findings

represent data from a case study using an observation checklist and notes taken and open-ended questions posed during the semi-structured interviews of Year 4 and Year 6 teachers in Malaysia and in Australia. Table 8.7 provides a summary of Kuhlthau's themes and sub-themes derived from the findings regarding the information-seeking processes of school children using the Internet for academic purposes.

<b>Kuhlthau's six stages of ISP</b>	<b>Australia</b>	<b>Malaysia</b>
Initiation	Problem identification Instruction Experience and knowledge Research skill Reading skill Motivation Digital savvy Familiarity	Task objectives & requirements Instruction Experience and knowledge Student capability Familiarity Class composition
Selection	Search engine used Keywords Spelling Search results list Internet safety Information provider Demonstrate at board	Search engine used Keywords based on class level Reading and spelling Search results list Sites selection Images, video clips and songs English Language (Translation/meaning)
Exploration	Trustworthiness of sites Subject knowledge Literacy skills Reading and spelling skills Sites selection Credibility of authors Updated information Scan Information	English language proficiency Picture and images Site selection Reading and spelling Analysed information Computer competency Images
Formulation	Restructuring the information found Elaboration Scanning Evaluation/judgement	Credibility of authors

<b>Kuhlthau's six stages of ISP</b>	<b>Australia</b>	<b>Malaysia</b>
Collection	Copying, cutting and pasting Filtering Rewording Summarising Compiling	Editing Animation Referencing Summarising Copying, cutting and pasting
Presentation	Execution Format presenting the information Plagiarism References Presentation Discussion Font	Execution Formatting Electronic (email & blog) Save in thumb drive Printed
Assessment	Reward such as free time and playing games	Checking through online assessment

**Table 8.7: Thematic analysis from observations of children and teacher interviews**

### 8.4.1 Similarities in Findings

Both quantitative and qualitative responses have shown some similarities in findings. From Table 8.7, findings show that at the initiation stage most of the teachers in both countries agreed on using the Internet for assignments by following their instruction. Teachers explained the task objectives and requirements before students start their information-seeking from the Internet. Teachers encouraged the students to use it for academic purposes to support their learning processes. From the quantitative findings, it is shown that the Internet was the most popular resource among primary school children from both countries using their school's network, with a total of eighty-two school children (66.67%) reporting that they used this resource, and one hundred and five school children (85.37%) revealing that the purpose in seeking information on the Internet was to fulfill the needs for school assignments.

Australian and Malaysian teachers found that the students with experience using the Internet at home had more knowledge and skills in seeking information from the Internet in the school setting. This was because students were more familiar with how to operate the computer and with the search engine used. A majority of the school children (91.5%) reported having a computer at home, suggesting they were exposed to and experienced in using a computer, making them computer-literate, and a majority of the school children (69.91%) had a computer with Internet access at home. However, it was not guaranteed these students could find the relevant information from the Internet for their academic purposes. Teachers in both countries claimed that this was because students still had problems in understanding the right keywords in order to get the relevant information. My observations of the students also indicated that they were struggling to search for information on the Internet due to a lack of information literacy skills.

Although the teachers encouraged their students to use the Internet, in relation to the frequency of use of the Internet environment to seek information, 52% of the respondents reported that they “sometimes” or “never” used the Internet environment. This could be due to the fact that the school children’s activities were still attached to their class assignments which were based around resources provided by the school. This would be especially true for the Malaysian education system, where students in Years 1 to 6 (aged between 7 and 12 years) are highly dependent on the use of textbooks and activity books, and are given many homework exercises based on the school’s textbooks. Thus, the use of other materials especially from the Internet might not be prominent. This suggests the Malaysian students rely totally on textbooks as primary resources for academic purposes.

At the selection stage, the majority of the Malaysian school children reported in the quantitative research that they used Yahoo followed by Google as their favourite search engine; however, during the observation sessions it was found that majority of them used Google as the search engine. Meanwhile, the Australian school children said they preferred Google, followed by Yahoo. This shows that these were the two search engines most commonly used by the school

children within their school network. Teachers from both countries agreed that keywords, navigational skills, reading and spelling skills are important elements in seeking information from the Internet. Regarding the site selection, thirty school children from both countries, chose the first results from the list of search results to explore information from the site selected. School children claimed “first always the best”, without judging and evaluate from a few site selection, except for one student.

### **8.4.2 Differences in Findings**

As shown in table 8.7, in Case Australia, information-seeking covered a wide range and varied scope as all the subjects such as Mathematics, Integrated Study, History and Science benefited from the use of the Internet. In contrast, the information-seeking process in Malaysia focused specifically on the areas of teaching and learning in the Malay and English language called Computer Literacy in Language for 60 minutes per week.

The main differences in the findings (see Table 7.7 in chapter 7) were that it was compulsory for the primary school children from Malaysia to use the Internet for two subjects (Malay Language and English Language). In contrast, teachers in Victoria, Australia encouraged students to use the Internet and frequently used it to support their teaching and learning processes, especially in completing classroom assignments, but there were no specific subjects which required students to use the Internet. In Case Australia, the students and teachers had more freedom to choose the topic in which they were interested. Before the teachers provided a task, they would elaborate to ensure the students were familiar with the subject matter. Therefore, students should be able to identify the problem of the task given. Teachers in Australia generally assumed the school children were “digital savvy” based on previous work they had undertaken done at school. Thus, the freedom of choice was in contrast to the practice in Malaysia. Freedom of choice allows students to expand not only their knowledge but also their experience with regard to various fields and areas of study. Teachers in Malaysia highlighted the task objectives and what requirements were required.



Additionally, teachers in Malaysia assigned tasks depending upon student capability and the students grouped based on those capabilities.

About 67.5% of the primary school children claimed that they sometimes received help from their teachers and 45.5% said they did not need assistance from teacher librarians. Students tended to independently seek information from the Internet for their assignments and sometimes received help from teachers, especially in Malaysia for weaker students. In Malaysia, the teachers had to classify different types of teaching and learning processes for the different types of students who they called “advanced students” and “weaker students”. For the advanced students, teachers just explained what topic to search for in order to complete the assignment; however, for weaker students, teachers had to show step by step and use more images, video clips and songs rather than text in order to teach that type of student. Another important finding relates to the differences between the education systems in Australia and Malaysia. In the Malaysian education system, there was a tendency to be examination oriented; therefore, class composition was based on examination results.

The teachers found that the ability and level of thinking of the students influenced their Internet seeking skills. Malaysian teachers had to identify students’ skill levels before assigning tasks. The ratio of student per class in Malaysia was 1: 47 and in Australia it was 1: 20 resulting in Malaysian teachers having to work harder in order to deal each student individually. To assist this, teachers in Malaysia encourage students to practise using the Internet at home with parents or siblings. In this way it may help to develop Internet skills for searching information.

Regarding the role of teacher librarians, the students claimed that they did not need assistance from them as the teacher librarians did not play a role as an instructor of information literacy. In both Malaysia and Australia, no emphasis is placed on the role of teacher librarians to guide or assist students in their assignments.

The Malaysian primary school children were found to have difficulty in finding information from the Internet compared to the Australia primary school children. This was demonstrated by the Mann-Whitney U Test for the “difficulty finding information” variable, with the significance ( $p = 0.0044$ ) indicating a significant difference between the Malaysian and Australian groups regarding the school children’s difficulty in finding information for their class assignments. This appeared to be due to English proficiency as most of the available websites were in the English language. This was one of the major challenges faced by the Malaysian teachers. As we know, English is not the main language used in Malaysia. Teachers have difficulties in translating and providing the meanings to the students. Student claimed that teachers encouraged them to refer to the dictionary for words they do not understand. Again, indirectly, the “read and take notes on ideas” variable indicates that the Australian school children were more likely to read and take notes on the ideas that they gained from their Web searching activities. Malaysian teachers emphasised that English language proficiency was important for Malaysian primary school children in Internet searching. In general, the Malaysian teachers perceived that the teaching of the Malay language using the Internet was ineffective. This was due to a number of critical factors, one of them being that there were no relevant sites developed for the purpose of teaching the language online. As a result, the teachers individually struggled to explore, compile and plan relevant content material for the students. As a consequence, the students were unable to seek information effectively from the Internet. In Australia, the teachers did not face these kinds of problems except for the research skills. Australian children also lack these skills, and long-serving teachers also admitted that they hardly used the Internet to support teaching and learning because they were not expert or familiar with this technology.

Australian teachers promoted the exploration of sites based on the credibility of authors and trustworthiness of the sites. However, this rarely happened; and again from my observations, students chose either the first or second result as their best selection without checking the credibility and trustworthiness of the sites.

At the formulation stage, teachers encouraged students to gather as much as information from the Internet and scan the information retrieved in order to get the best answers for their assignments. In theory, the more they used the Internet, the more they should understand which search engine and search results to choose. However, only one student from Australia genuinely completed the formulation stage. She opened a few sites, read the information, found, restructured and elaborated upon it. The majority of students realistically skipped this stage and directly copied, cut and pasted the information found. Teachers explained to the school children to choose the sites that appeared trustworthy and had credible authors. Such critiquing of information appeared to prove too difficult for the majority of the students.

For the collection stage, school children from both countries tended to copy, cut and paste the information, including pictures, did the summarising and rewording the sentences in order to complete their assignment. However, Malaysian teachers had a different technique to tackle “weaker students” by asking them to copy the information found and later edit it together with them.

For the presentation stage, Australian teachers generally asked students to present their work at the end of the class session and discuss it openly with others in the class. It tended to be only for the larger projects that students had to submit their work as an assignment, with detailed information and a list of references. However for this study, it only focussed on daily tasks provided by the teachers. It was a difference case in Malaysia where Malaysian teachers encouraged their students to send their work electronically (via email, blog or copy to thumb drive), rather than a printed version.

### **8.4.3 Emerging Findings**

From the case study, it appears that teachers from both Australia and Malaysia focused more on the actions associated with information-seeking processes most relevant to learning. In this context, the teachers integrated information skills, technology and network literacy to guide students in seeking information from the

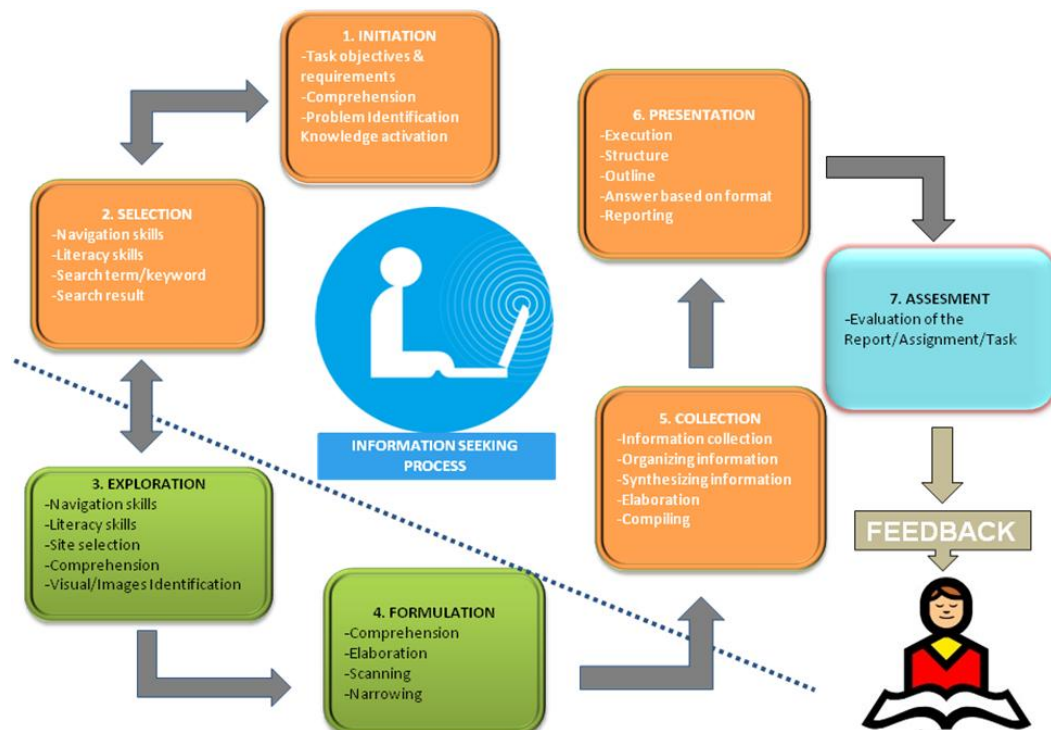
Internet for academic purposes. The students and teachers in this study also identified that assessment is another important element that should be included in the information-seeking processes as evaluation factors for the student. Students need to get feedback in order to improve their assignments and information-seeking skills. No formal assessment was in place in either country. With the application of formal assessment, students may be motivated to do better in their final projects or assignments and this may indirectly improve their seeking and literacy skills. Teachers from both Malaysia and Australia conducted informal assessments. For example, if Australian students completed their assignments, they received a reward of free time and playing games on the Internet. For the Malaysian primary school children, especially for the Malay Language subject, the teachers and students just checked the assignments using an online checking system as the assignment was based on online assessment.

### **8.5 “What are the processes undertaken by school children when searching for information for academic purposes from the Internet?”**

In answering this research question, “What are the processes undertaken by school children when searching for information for academic purposes from the Internet?”. Kuhlthau’s information search stages of initiation, selection, exploration, formulation, collection and presentation were adapted to understand information-seeking processes using the Internet among primary school children in Australia and Malaysia. The study used and further developed Kuhlthau’s model of the information search process (1993). New sub-themes were derived and assessment stages and feedback were incorporated into Kuhlthau’s model as shown in figure 8.4. This study also highlighted that the cognitive and action stages were seen as relevant to the information-seeking processes by school children in order to complete their assignments. The teachers focussed more on the actions associated with information-seeking processes as being most relevant to learning; that is, actions such as how to use the Internet and how to synthesise,

organise and evaluate the information found, whereas Kuhlthau did not integrate information skills or literacy into her model.

Figure 8.4 shows the revised information-seeking processes derived from the research findings. The dotted line illustrates that about 59.7% students in both countries undertook the information-seeking processes through initiation, selection, collection and presentation, and the remaining 40.3% did most of the processes of Kuhlthau's information search which includes exploration, except the formulation phase. Only one student completed the formulation stage. It appears that the assessment stages need to be highlighted before students get feedback about evaluation of their assignment. Also illustrated in Figure 8.4 is the finding that the students tended to skip around the six stages of Kuhlthau's information search process, with the pattern of the search process revealed to be iterative rather than a linear sequential process. During the search process, the students repeated the activities at various stages of the search process, such as the selection of sites.



**Figure 8.4: Information-seeking process by primary school children in Malaysia and Australia**

## **8.6 “What are the successful factors and challenges that primary school children face when searching information from the Internet for academic purposes?”**

This study discovered that the four main factors involved in information-seeking processes as input elements were: information behaviour (primary school children’s characteristics), information need (type of task given), information environment (Internet usage) and information use (completed assignment). The research also found that after the primary school children submitted their tasks, they need to get feedback from the teachers in order to evaluate their output element which is their completed task or assignment, and this would indirectly improve their information-seeking skills using the Internet. This can be shown from the observation findings, where some school children asked me if their answer was right or wrong. Facilitation of the input, output and feedback components may contribute to successful information-seeking processes by primary school children.

### **8.6.1 Information Behaviour**

The term “information behaviour” is used in preference to the term “information seeking” (Wilson, 2000). In order to investigate children’s information-seeking processes, it is relevant to look at their information behaviour. Wilson (2000) claimed that information behaviour covers information seeking, including both active and passive information seeking and information use. Meanwhile, Krikelas (1983) argued that in order to investigate information-seeking behaviour, it is important to understand the purpose behind the behaviour. Kuhlthau (1993) highlighted that thought, actions and feelings were involved during the information-seeking process. Information behaviour demonstrates many different aspects related to the individual’s experience of finding information.

### 8.6.1.1 Openness to Experience and Competitiveness

According to Heinström (2003), information behaviour could be connected to all personality dimensions such as neuroticism, extraversion, openness to experience, competitiveness and conscientiousness. In this study, the majority of the children's information behaviour was openness to experience and competitiveness. The children were excited and ready to do the task given to them. They tried to use any possible experience and knowledge that they had and at the same time tried to finish the task given to them as fast as they could. The average earliest task for students in both countries was 9 minutes. Students showed feelings of relief at the end of the process rather than to a successful learning outcome. (Holliday and Li, 2004)

Motivation was also found to be one of the important elements in children's information behaviour. Motivation can be defined as an "internal state that leads to effort expended towards an objective" (Dubrin, 2004, p. 184). The students were motivated to do the task if they thought they would receive something in return. This evidence could support the expectancy theory of motivation (Dubrin, 2004), which is based on the premise that how much effort people expend depends on the reward they expect to receive in return. The concept of "what is in it for me" may be apply to children's information behaviour and motivate them to complete the task given. There are three basic components of expectancy theory that could motivate children in doing their task:

1. Effort to performance expectancy – where a person believes they can perform the task, such as the children believing that they can perform the task based on their knowledge, experience and skills.
2. Performance to outcome expectancy – where a person believes that performance will lead to certain outcomes, such as the children believing that if they perform or do the task, in return they will be rewarded.
3. Valance – where a person highly values the outcomes, such as the children highly appreciating the rewards given to them and feeling proud of themselves.

With these three components of expectancy theory in place, primary school children can be indirectly motivated to become active information seekers.

#### **8.6.1.2 Knowledge and Experience**

Students from both Australia and Malaysia faced difficulty at the initiation stage due to limited knowledge and experience. The children's information behaviour was affected by their knowledge and experience. This was found to be one of the main critical issues in their information-seeking processes. In this study, the children were expected to use the same search engines as adults for seeking information from the Internet. However, their information needs, research approaches, cognitive abilities, skills and developmental levels differ from those of adults (Kuhlthau, 1991; Walter, 1994; Borgman et al., 1995; Hirsh, 1999; Xie, 2008; Piaget & Inhelder, 1969). The findings presented in this thesis indicate that children used the Internet as their main resource for class assignments and the majority of them were moderate users. About 81.3% of the school children claimed that they had moderate skill with regard to their Internet ability. From an information-seeking perspective, the school children had difficulty in acquiring accurate information as their lack of Internet skills influenced the outcome. They also claimed that they did not get the expected results. The high standard of the written text also affected the accuracy of the information sought. Although the school children reported that they could search for the information themselves, they also needed a teacher's help. Knowledge and experience closely related to cognitive skills. Cognitive skill is "a mental process used to perceive and make judgements from information" (Dubrin, 2004, p. 21). Children answered the task based on their preferences, such as how long it will take because they want to finish it as fast as they can. This may be due to there being no assessment involved.

Bloom's taxonomy and Piaget's cognitive development stages have demonstrated that children's intellect is developed in stages over a certain number of years. For this study, children at the age of 11 years to 12 years old take an average duration of 11.53 minutes to complete their task compared with children aged 10 having an



average duration of 9 minutes. Children at lower ages, relatively speaking, show they may be lacking in the areas of cognitive domain: knowledge, comprehension, application, analysis, synthesis, and evaluation. Based on the earlier explanation in Chapter 3, teachers should apply Bloom's taxonomy to guide school children in the teaching and learning process. Students should have basic knowledge of the problem in order to identify what the problem is and what topic to search for using the Internet. This allows school children to increase their comprehension, which involves their ability to grasp meaning and use the information discovered. At a later stage, school children can apply the knowledge gained whenever it is required. They will be able to demonstrate information use in order to solve the given problem. The next step that students should be able to perform is analysis, which requires the ability to discuss the relationship between pieces of information. School children also should be able to synthesize which involves arranging and organizing the information in order to produce problem solving answers. Finally, students should be able to evaluate the information as the highest level of cognition and relate it to creating, developing and writing ideas before they present to their teachers.

This again complements the findings from my observations that children aged 10 years old seem to understand the task given, however this is not always the case. With proper guidance from teachers, they can perform their search task correctly.

#### **8.6.1.3 Teachers Guidance and Competencies**

Teachers need to reflect on the information seeking of children in schools and whether the present teaching of information skills can enable children to cope with the volume and complexity of the current digital information. At the same time, they should also encourage children to take a critical approach when finding and evaluating information. Madden et al. (2006) found that the factors that determined children's ability to search successfully were the amount of experience using the Internet, the amount of guidance, and the ability to explore the virtual environment and to use the tools accordingly. While the Malaysian teachers' main priority was to find relevant syllabus content on the Internet, they

also considered that the class composition and the ability of the students influenced the use of the Internet in the classroom. This situation also occurred for Australian teachers who claimed that, depending on the students, some of them have greater skills. They know how to scan through the whole page from top to bottom and some of them need minimal guidance. Teachers need to collaborate with teacher librarians to foster a resource-based learning experience and environment, especially in dealing with the Internet. This is because qualified teacher librarians, as defined by ASLA, have competencies in information literacy skills and information management in order to support students and teachers in teaching and learning processes. According to Katz (2013), many students lack of ICT literacy skills to navigate, evaluate and use the overload information available today. Therefore there is a need to have teachers expert in ICT literacy skills and students should be able to combine the technical and cognitive skills to be productive as information seekers. “ICT literacy is the ability to use, communicate to solve information problems in order to function in an information society”. (Katz, 2013, p. 4)

### **8.6.2 Information Need**

The complex and changing environment affects children’s information behaviour and especially their information needs (Agosto & Hughes, 2005). The information needed by the school children in this study was often an assigned task or problem which required them to seek and collect any relevant information in order to solve the task. Dealing with information in the education context is necessary as a means to reduce uncertainty (Belkin et al., 1982), to bridge a gap (Dervin, 1983) or for problem solving (Wilson, 1999). Children need to understand the purpose of their information seeking, identify the tasks or problems and seek the appropriate information sources. An early study by Minudri (1974) identified five areas where information need arises for young people: school and curriculum need, career information need, recreational need, personal need, and accomplishment of skills and information need.

### **8.6.2.1 Type of Task**

In this study, the information task that the children needed to fulfil was a school and curriculum need. The task was created by the teacher and the students needed to complete an assignment within the school setting. The type of task given by teachers does influence primary school children's information-seeking processes. According to Schacter, Chung and Dorr (1998), based on their findings related to fifth and sixth grade students, the searching performance of these young children indicated that children had more successful searches on ill-defined tasks compared to well-defined tasks. From the observations conducted in the present research, in the initiation stage, students in both Australia and Malaysia had more difficulty answering the well-defined task, which was Task 1 regarding pollution, compared to Task 2 (Transportation) and Task 3 (Interesting places) which were considered to be ill-defined tasks. This was due to the fact that the students could easily browse the answers through the Internet for the former task, whereas with an ill-defined task they can find more potential answers and they may feel there is no right or wrong answer as it is based more on their own point of view and opinion.

### **8.6.2.2 Familiarity**

Familiarity with a given topic makes the process of seeking information more interesting and may give better results (Wildemuth, 2004). Previous research has shown that students were more motivated if they were allowed to choose their own research topic (Bilal, 2001; Hirsh, 1999). In the present study, the Australian primary school children had freedom to choose any subject or topic that interested them to explore on the Internet as mentioned by AUST1, an Australian teacher. In comparison, the Malaysian students had to follow the curriculum syllabus and often the teachers determined the nature of the research assignment rather than the students making their own choice. Freedom of choice allows students to expand not only their knowledge but also their experience with regards to various fields and areas of study. Students show their self-confidence with topics which they are familiar with and this could explain why they feel insecure during the use of the Internet for academic purposes (Watson, 2001). Unfamiliarity with the topic and

the structure of the Web increases the difficulty of the search process (Coiro & Dobler, 2007).

### **8.6.3 Information Environment**

Information need is an important element for students in current information retrieval theory, practice and systems design. Cole (2012) stated that in order to design information retrieval systems, the information need of the users is important as a basis to engage the user's knowledge or belief systems. Cole further explained that the user's information environment will lead to reduced information overload, improved search results and enhanced usefulness of information.

#### **8.6.3.1 Internet Use**

Young people show ease and familiarity with the Internet (search engine used), however they are less comfortable dealing with the content of the information (reading) and do not possess the critical and analytical skills to assess the information that they find on the Web (Rowlands et al., 2008).

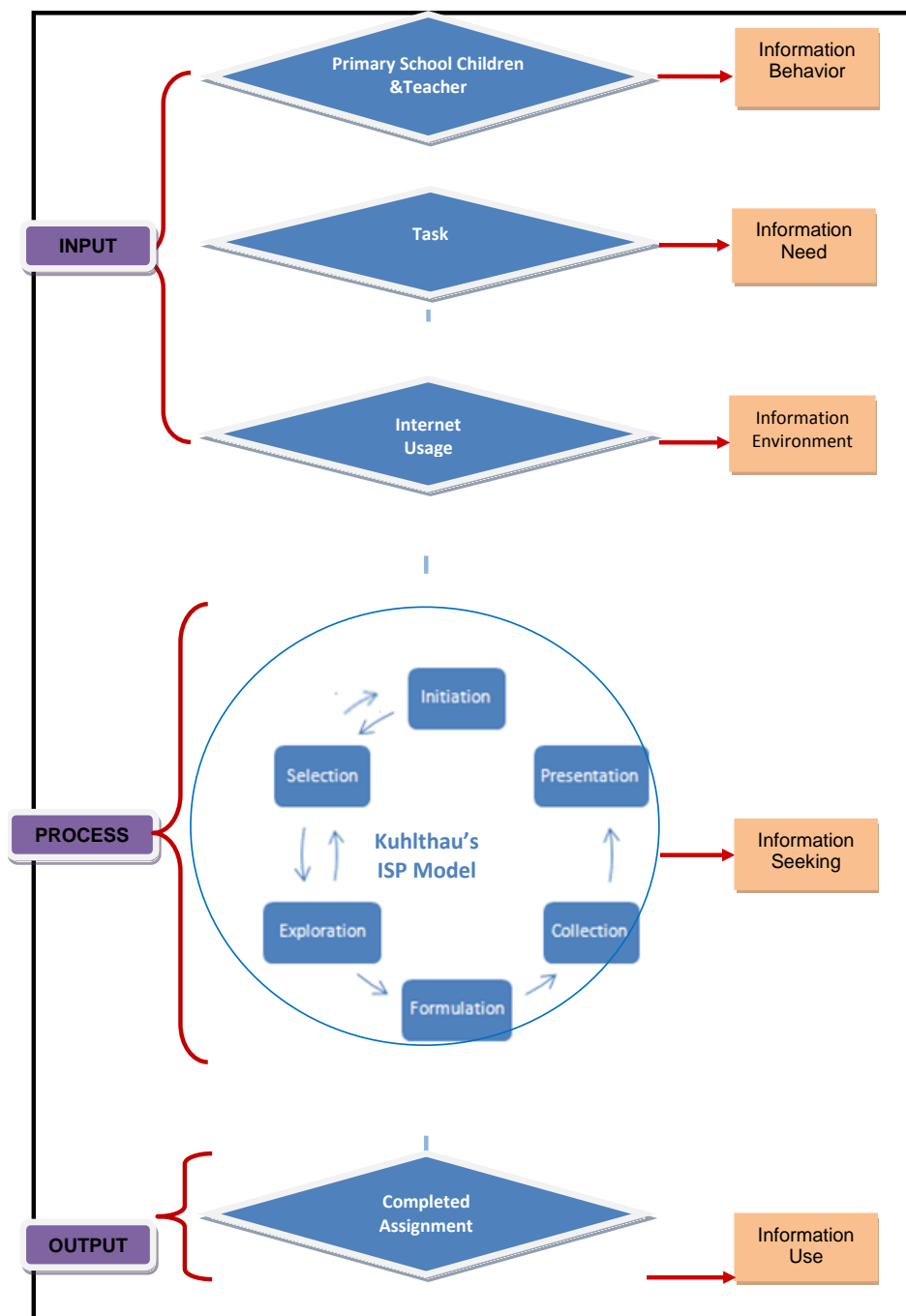
The use of the Internet has fostered changes in students' learning styles, especially in the steps taken to complete assignments given by teachers. Since the Internet has become embedded in the curriculum in Malaysia and Australia, students in both countries need to have competence in using search engines and in digital knowledge production (Van, 2010). Difficulties in basic language skills, basic computer skills and critical thinking contribute to stress and frustration when the students find unrelated information on the Internet. Children are often unaware of the nature of the information available on the Internet and tend to unconditionally trust it. In my observations, for example, some students simply clicked on the sponsored and advertising menu button, without checking the credibility and trustworthiness of the sites. According to Li et al. (2007), the Internet may or may not present accurate information to users. Factors related to the design and structure of the search engine appear to influence the information-seeking process

of primary school children. It would be better for a listing of the results to have a short summary of the content retrieved and documents related to the query to be presented, such as in Google, and at the same time provide a “do you mean?” menu whereby students can correct their search term or keywords if they type wrongly or have a spelling problem. The findings indicate that the students tended to type incorrect keywords due to a lack of spelling skills. For example, instead of pollution, they typed “poluton”. The primary school children seemed to have computer competencies but not information-seeking competencies when using the Internet.

#### **8.6.4 Information Use**

Information use is the way primary school children use the information that has been collected and to complete their assignments. It must cover the assignment requirements, such as format (text, images, pictures), language used, and ideas, and the information should solve the problems or answer the task given. It then should be evaluated by the teachers in order to improve the students’ information-seeking skills.

As shown in Figure 8.5, this study discovered there were three main factors involved in information-seeking processes as input elements from the information perspective: information behaviour, information need and information environment. Meanwhile, the output element was the information use that needed to be evaluated so that it may contribute to successful information-seeking processes undertaken by primary school children.



**Figure 8.5: Input and output elements for the information-seeking process**

### 8.6.5 Challenges in Finding Information from the Internet

The survey findings show that there were different challenges in using the Internet between the Malaysian and Australian students, with 49.25% of the students in Malaysia claiming that the biggest challenge they faced was the network accessibility, followed by 40.3% who said that they lacked Internet skills. Meanwhile, in Australia, 30.36% of the school children claimed that their main challenges were their inability to get the necessary (or accurate) information and that the obtained text, such as the reading material, was usually too complex for their comprehension. This is true, due to Malaysian children finding the use of English language as their main issue in this research. Furthermore, teachers have to follow syllabus in ICT literacy subject in English language, and English language is their second language.

However, from Malaysian teachers' perspective, the challenges that the primary school children had to face were the limited availability of sites and the lack of suitable and relevant sites for primary school children especially for Malay Language subjects. In contrast, Australian teachers found that school children faced difficulties with research skills. Other factors applied in both countries, such as English proficiency, reading, spelling, time constraints, lack of computer facilities and scalability in the Internet also caused challenges or difficulties for students when seeking information on the Internet. From my observation, primary children have a difficulty in getting accurate information to solve their tasks and in the end they just simply 'cut and paste', or answer questions based on their knowledge, which is not necessarily from information found from the Internet. This situation may happen due to not knowing how to formulate search terms, or keywords which can lead them to irrelevant sites.

There is no doubt that children nowadays have more access to the Internet via personal computers, tablets, smart phones, and other facilities in schools. Using the Internet requires a set of specific skills that children need, along with the proper guidance and training. Madden et al. (2006) identified three factors that impact on the search performance, namely: ability, guidance and experience.

## 8.7 Summary

This chapter discuss the findings derived from qualitative data (observation and interviews) and triangulate with quantitative data (survey) in order to answer the research questions. This chapter discussed and highlighted the key features of Malaysian and Australian primary school children information-seeking processes for academic purposes using the Internet in school setting. The key features were as follows:

<b>Kuhlthau's six stages of ISP</b>	<b>Cognitive / thought / knowledge</b>	<b>Action / strategies</b>	<b>Feelings</b>
Initiation	Problem identification Task objective Experience Familiarity	Research skill Reading and Spelling skills Language proficiency	Motivation Confident Neutral Nervous
Selection	Locate the related topic, search engine used and language	Keywords Spelling and Reading skills Navigational skills	Neutral
Exploration	Review accurate information English Proficiency Credibility of authors Trustworthiness of sites	Reading and Spelling Site selection	Neutral
Formulation / Evaluation	Analyse information found	Restructuring information found Scanning Evaluation and Judgement of information	Neutral
Collection	Compile and integrate the information and transfer/propose/develop it into knowledge	Copying, cutting and pasting Rewording Summarising Compiling Knowledge Familiarity	Neutral
Presentation	Creating a new knowledge	Execution Formatting Referencing Discussion	Confident Frustration



Kuhlthau's six stages of ISP	Cognitive / thought / knowledge	Action / strategies	Feelings
Assessment	Knowledge contribution	Reward Evaluation	

**Table 8.8: Key features of information-seeking process among primary school children in Malaysia and Australia**

Table 8.8 shows that school children place more emphasis on action/strategies from Kuhlthau's model of the six stages of ISP; cognitive skills developed and knowledge increased from one stage to another. Meanwhile students felt only involved at the beginning and end of the ISP stages. The children had mixed feelings at this stage such as confidence, neutral feelings and nervousness. Throughout, feelings seem to be relevant to Kuhlthau's model of ISP, however, from the teachers' perspectives, concern was not with how students were feeling, but instead more focussed on action and school children's cognitive skills development. From this study, the key findings can be summarized as follows:

- **Initiation:** At the initiation stage, primary school children need explanation and guidance from their teachers before they commence seeking information from the Internet. School children need to recognise the task objectives, problem identification, and kind of information that is needed to complete an assignment. With proper guidance, students will be able to familiarise themselves with the task provided. With experience, students tend to improve with identifying the problem and motivation to seek information from the Internet.
- **Selection:** During the selection stage, the task is to identify and select a general topic to be investigated. School children begin their search based on the guideline given and their search based on the requirements of the assignment. Again knowledge, experience and familiarity influenced them in order to select and use common search engines that been taught to them (by teachers, parents, siblings and friends). School children located the relevant topic and typed keywords that normally identified material for the task given. However, even though they can

copy the words from the task given, they may still have spelling problem which can lead them to irrelevant or inappropriate sites. Generating and combining keywords or search terms as one important element in seeking information from the Internet.

- **Exploration:** School children normally choose either the first and second sites from the search list. Their reading depends upon: reviewing accurate information, English proficiency, and where possible, the credibility of authors and the trustworthiness of sites. Some of the school children browsed more than one resource to locate pertinent information and were able to identify the most related information for solving tasks given by the teachers.
- **Formulation/Evaluation:** School children were required to review, analyse and choose the best information found in order to complete their task assignment. Teachers encouraged the students to scan, evaluate and judge the information and later restructure the information found. However, this does not always happen as the majority of the school children tended to skip this stage as they assume the first or second search results are always the best for them to complete their task. Teachers encouraged school children to judge and evaluate the information found in order to satisfy an information problem by determining the credibility of content, updated information, bias, authority and other aspects of materials
- **Collection:** At this stage, students start to compile and organize all related information found, integrate it, and later develop and propose it as new knowledge to them. School children use strategies such as copying, cutting and pasting, rewording and summarising the information in order to develop the new knowledge.
- **Presentation:** At the presentation stage, students finalise the task given (knowledge creation) either in text and/or picture depending on the task requirements, which may include formatting and referencing. To avoid plagiarism, if they do copy and paste, teachers encourage students to

formally quote material and reference the relevant sources. At this stage the majority of students felt confident and relieved as they completed the task given, however a few of them felt frustrated as they were worried they may have provided wrong answers and therefore not complete the task correctly.

- **Assessment:** This is the final stage. School children need to receive feedback about the task in order to improve their learning processes and Internet skills. Teachers need to assess the tasks and discuss the outcomes with the students. School children tend to appreciate feedback and it motivates them to do their best in subsequent tasks/assignments. As was discussed in Chapter 3 in regard to Expectancy Theory (Dubrin, 2004), motivation of students is a key success factor.

The last chapter concludes the research and provides some policy recommendations and further research.

## 9 Conclusion

### 9.1 Introduction

The conclusion chapter discusses the links in the analysis of the data collected in the survey, observation and interview findings to show the information-seeking processes by primary school children in Malaysia and Australia. The study was carried out as there is a lack of research on the impact of the Internet on children's information-seeking processes for academic purposes. The study aimed to answer the following research questions:

1. What are the processes undertaken by school children when searching for information for academic purposes from the Internet?
2. What are the success factors and challenges that primary school children face when searching for information from the Internet for academic purposes?

The chapter discusses the application of and barriers to the findings in understanding the information-seeking processes by primary school children using the Internet. The contributions of this research are discussed, followed by an overview of the limitations of the study as well as recommendations for further research.

Tables 9.1 to 9.5 present the results of the analysis of the survey, observations of students and teacher interviews. The summary focuses on the data that answers how primary school children undertake information-seeking processes using the Internet for academic purposes, in relation to each element of the information-seeking framework.

### 9.1.1 ISP Framework Element: Input – Users (Children/Students)

Children are expected to use the same search engines as adults for seeking information from the Internet. However, their information needs, research approaches, cognitive abilities, skills and developmental levels differ from those of adults (Kuhlthau, 1991; Walter, 1994; Borgman et al., 1995; Hirsh, 1999; Xie, 2008; Piaget & Inhelder, 1969).

Survey analysis	Observations	Teacher interviews	Commentary
<p>Most of the school children had been in their respective schools for more than one year, allowing them to be familiar with the education system of the school and to have experienced using the Internet in that school setting.</p> <p>Most of the school children reported having a computer at home, suggesting they were exposed to and experienced in using computers and were computer-literate, and a total number of eighty-six school children had a computer with Internet access at home.</p>	<p>The majority of the students identified and understood the task given.</p> <p>Students from both countries were excited and ready to do the task given to them. They tried to use any possible experience and knowledge that they had and at the same time tried to finish the task given to them as fast as they could; however, students were found to be motivated as active information seekers if they were familiar and</p>	<p>Teachers from both countries claimed that the students' knowledge and experience were important elements for information-seeking processes, regardless of what resources were used.</p> <p>Australian teachers were given freedom of choice regarding the subject for which they think it is appropriate to use the Internet to support the curriculum. Students were motivated to explore based on their interests and this indirectly enhanced their research and reading skills in the information-seeking processes.</p> <p>The teachers in Malaysia agreed that the students who have experience from using the Internet at home normally did not have as many problems seeking information from the Internet but they still needed proper guidance.</p> <p>Teachers from both Australia and Malaysia considered that the students' ability to read, spell and navigate was important throughout the information-seeking process.</p> <p>The Malaysian teachers emphasised that English language proficiency was</p>	<p>Children are exposed to and gain experience using the search engine that they learn about parents, siblings and friends.</p> <p>The study found that good experiences, knowledge, familiarity, motivation and proper guidance in literacy skills will improve student's information-seeking processes.</p> <p>Primary school children's main challenges in seeking information from the Internet are less literacy skills and navigation skills. Other</p>

Survey analysis	Observations	Teacher interviews	Commentary
The majority of the school children claimed that they had moderate skill with regard to their Internet ability.	experienced with the subject knowledge or topic given to them.	important for Malaysian primary school children in using the Internet for seeking information.	challenges are content credibility, language barriers and digital divide.

**Table 9.1: ISP element - input (users)**

### 9.1.2 ISP Framework Element: Input – Information Environment (Internet Usage)

As the Internet has become one of the most important sources of information in supporting their learning environments, children's information seeking has become an emerging issue. Many studies have identified a number of challenges and problems with children's information-seeking strategies due to their inadequate knowledge of how to use search engines, their limited research skills and the poor structure of the Web itself (Bilal, 2000, 2001, 2002).

Survey analysis	Observations	Teacher interviews	Commentary
There was a similarity with regard to the amount of time allocated to the school children's use of the Internet within the school environment in both countries.  The Internet is the most popular resource among primary school	The use of the Internet has fostered changes in students' learning styles, and the steps taken to complete assignments given by teachers.  Difficulties in basic language skills, basic computer skills and critical thinking contribute to stress and frustration when the students found unrelated information on the Internet.  Children are often unaware of the nature of the information	Teachers from both countries encouraged the students to use the Internet for academic purposes.  The primary school children from Malaysia used the Internet for two subjects	Teachers from both countries encouraged the students to use the same search engines as adults.

Survey analysis	Observations	Teacher interviews	Commentary
children in both countries using their school's network.  Malaysia's children experienced network asssesibility as a challenge in finding information from the Internet and "other" challenges such as language, spelling and reading compared to Australian children.	available on the Internet and tend to trust it.  This showed that the students' information-seeking processes using the Internet were much more complex than looking for information using traditional methods. This complexity was due to the selection of the search engine, the predominance of English language in Internet content, large amount of information available, lack of knowledge and experience to identify the credibility of sites, as well as problems in reading and spelling.	(Malay Language and English Language). In contrast, the teachers in Australia encouraged their students to use the Internet but there were no specific subjects which required students to use the Internet.	Google was the most popular search engine used in this study followed by Yahoo.

**Table 9.2: ISP element - input (Internet usage)**

### 9.1.3 ISP Framework Element: Input – (Task/Assignment)

The use of the Internet has fostered changes in students' learning styles, especially in the steps taken to complete assignments given by teachers. Since the Internet has become embedded in their curriculum, students need to have competence in using search engines and in digital knowledge production (Van, 2010). Students have self-confidence in searching the Internet for personal use, but insecurities when using it for academic purposes (Watson, 2001). According to Schacter, Chung and Dorr (1998), the search performance of fifth and sixth grade students indicated that children had more successful searches on ill-defined tasks compared to well-defined tasks.

Survey analysis	Observations of children	Teacher interviews	Commentary
<p>Most students from both countries used the Internet for the purpose of seeking out information to fulfil the needs for school assignments.</p> <p>There was a significant difference in searching for the Language, Science and Technology information between primary school children in Malaysia and Australia. For Malaysian primary school children, the Language subject showed the highest frequency in using the Internet in the school environment as the Internet was embedded in this subject in the curriculum.</p>	<p>The type of task given by teachers influenced primary school children's information-seeking processes.</p> <p>Students in both Australia and Malaysia had more difficulty answering ill-defined tasks. This was due to the fact that the students could easily browse the answers through the Internet, whereas with an ill-defined task they can find more potential answers and they may feel there is no right or wrong answer as it is based more on their own point of view and opinion.</p>	<p>Teachers in Malaysia had to teach different techniques and skills in seeking information from the Internet to different categories of students, due to the mixed class composition.</p> <p>Australian teachers agreed that, if they planned to give an assignment to students, they would explain the subject matter to them. This allowed the children to understand the subject matter, including a clear description and pictures, prior to attempting to look for information on the Internet.</p> <p>Teachers in both countries recognised two main elements that were important to the students: the search engine used, and the keywords and spelling.</p>	<p>Planning and instruction from the teacher before they ask students to seek information from the Internet are important. Familiarity with the subject matter and a clear description of the task prior to seeking information from the Internet were also important.</p> <p>This study tended to indicate that children from both countries had more difficulty answering ill-defined tasks compared to well-defined tasks.</p>

**Table 9.3: ISP element - input (task/assignment)**



#### 9.1.4 ISP Framework Element: Process - Information-Seeking Processes Based on Kuhlthau's Model

The present study focused on Kuhlthau's model (1993) with information-seeking processes for primary school children understood in six stages: initiation, selection, exploration, formulation, collection, and presentation.

Survey analysis	Observations	Teacher interviews	Commentary
<p>The Malaysian group more often had difficulty in finding information for their class assignments, compared to the Australian group.</p> <p>It appears that the Australian school children were more likely to read and take notes on ideas that they gained from their Web searching activities.</p>	<p>The students tended to skip around the six stages of Kuhlthau's information search process, and the pattern of the search process was revealed to be iterative rather than a linear sequential process.</p> <p>During the search process, the students repeated the activities at various stages of the search process, such as the selection of sites.</p>	<p>The case studies indicated that the teachers focused more on actions associated with information-seeking processes that were most relevant to learning; that is, on actions such as how to use the Internet, and how to synthesise, organise and evaluate the information found.</p> <p>In this context, the teachers integrated information skills, technology and network literacy to guide students when seeking information from the Internet for academic purposes.</p>	<p>The study extends Kuhlthau's model with input elements and output elements.</p> <p>The study also emphasises that, primary school children tended to skip the six stages of Kuhlthau's ISP model and the pattern of search process was revealed to be iterative rather than linear sequential process.</p> <p>Teachers focused more on actions and cognitive processes associated with information-seeking processes as being most relevant to learning, and not so much on feelings as described in Kuhlthau's model.</p>

**Table 9.4: ISP element - process (information-seeking process)**

### 9.1.5 ISP framework Element: Output – Information Found by the Students/Submission of Completed Assignment

Young adults believed in the virtual world as much as their real world as they were able to do anything on the Internet, and did not think that cutting and pasting is plagiarism (McCarron, 2004).

Survey analysis	Observations	Teacher interviews	Commentary
More than half of the children from both countries claimed they <i>sometimes</i> engaged in discussion with others based on the ideas they found, and the majority of them reported that they <i>always</i> had the intention to re-check the information found on the Internet prior to making a final decision in using the information for academic purposes. This is a good	About 59.4% of the students copied, cut and pasted the information found on the Internet. The remainder of the students rephrased and restructured their own sentences, and were more concerned about the layout of the assignment by formatting the text through the choice of font and bold emphasis and resized the pictures and images taken from the sites. The average duration taken by the students was based on	Teachers expected the students to submit the assignments based on the requirements given, and one of the requirements was to make a list of references. The teachers preferred their students to collect as much information as possible, copy, cut and paste, and later edit and rewrite in order to complete the assignments. Students who copied information from the Internet had to make sure that it was referenced.  Some of Malaysian teachers preferred to discuss the task submitted through email or blogs. It was a different scenario with the Malay Language subject, whereby the assignments were normally given online. Students immediately obtained the answer, and thus they automatically completed the assignments.  For the Australian teachers, most of the assignments were discussed openly, where the students presented it in front of the class and everyone could exchange their ideas and the teacher becomes a moderator.	Primary school children trusted that information available from the Internet was accurate and suitable to help them complete their assignment. Students tended to copy, cut and paste information found on the Internet.  Children reported that they sometimes engaged with discussion with others on the ideas found and always had the intention to recheck the information prior to making final decision to complete their assignment. However from my

indication that school children may be aware of the need to check the validity of the information gained rather than using it straight away for their class assignments.	the task.  The Malaysian primary school children showed the highest average duration for task 1 at 14 minutes, and for Australian children for task 3 the duration 13.33 minutes.	The teachers also emphasised the need to collaborate with the teacher librarian to provide the proper instruction to the students when seeking information from the Internet.  Teachers in this study also identified that assessment is another important element that should be included in the information-seeking processes as evaluation factors for the student. Students need to get feedback in order to improve their assignments and information-seeking skills.	observation and teachers' perspectives, students were more concerned about the layout of the assignment, such as the choice of font, and resizing the pictures taken from the sites. Students also show they want to complete the assignment as fast as they could.
--	---	--	---

**Table 9.5: ISP element - output (information-seeking process)**

The study identified that two additional variables, derived from the findings of this research, should be added to support the original model of the information-seeking process. These two variables, characterised as input and output elements, contributed to information-seeking processes for the primary school children. The study discovered that the original Kuhlthau model needs to contain input elements such as information behaviour, information need, and information environment that play an important role as success factors in the information-seeking process by primary school children in order to provide them with efficient information use or output, that is, a completed assignment. In addition, the model needs to include barriers such as social, cultural and language barriers which impact on children's information-seeking behaviour.

## **9.2 Barriers in the Information-Seeking Process among Primary School Children**

This study identified barriers regarding the information-seeking process by primary school children as follows:

### **9.2.1 Culture**

In comparing the two educational models in Malaysia and Australia, one influence that was not mentioned in Kuhlthau's model is the influence of culture and cultural differences. For example, the influence of culture lies in the social structure of both societies, one of which is developed and the other as a progressing nation. Hofstede's (2005) model of culture also shows there is a difference between Australia (Western culture) and Malaysia (Asian culture): power distance and individualistic vs. collectivistic as discussed in Chapter 2. This was supported from the interview and observation findings (power distance) and (individualistic vs collectivistic) that show the differences on primary school children seeking information from the Internet. Primary school children in Malaysia follow orders and instruction from their teachers, meanwhile Australian

school children tend to be very independent and self-oriented in determining the tasks given.

### **9.2.2 Language**

Language barriers are important issues in seeking information from the Internet for students in both countries, especially for Malaysian primary school children. Most of the available websites were use the English language, which may not be understood by some students in Malaysia. Teachers have to struggle to find relevant websites to prepare their lesson plans so that the information can be read and understood by the students. This has the potential to hinder the process of using the Internet as a resource to explore and collect information for academic purposes. In the Australian case, teachers seem to believe that children do not face difficulty in dealing with language in seeking information from the Internet. However, from my observation some of the Australian school children did have problems with language which may be due to their language background with more than 50% of the student population for each of the two schools selected having a language background other than English language.

### **9.2.3 Content Credibility**

Other issues discovered in this study included the level of accuracy and the credibility of the information provided on the Internet. Students from both countries seemed to trust the information provided by the Internet. Yet the information available on the Internet can come from anyone and can be based on personal opinions without any accountability for the content. Teacher librarians should be employed as information professionals at schools. Since all of the students used Google as their main search engine to find information from the Internet (despite the development of FUSE for primary education in the Australian schools in this study, and Malaysia Education sites for Malaysia schools), it is the responsibility of teachers and teacher librarians to teach strategies for evaluating Web pages. In teaching these strategies, has been

suggested (Savolainen, 2006; Metzger, 2007; Rachman and Buchanan, 1999) that the following criteria should be highlighted:

- Authority/credibility—Emphasise the value of information that is produced officially by an individual, organisation or government website to make sure that students get relevant, accurate, timely and concise information.
- Scope, coverage, objectivity—Teach students to identify the intended audience of a Web page.

Students should learn to consider the level of difficulty of material on the Web, the author's point of view, bias, and whether the information is free from advertising/sponsored links.

- Accuracy and timeliness—Students should consider when the page was produced/when it was last updated, and whether the facts or figures are accurate.
- Content/relevance—Students should consider whether the page meets the research/information need, or whether the subject is completely covered.
- Aesthetics—Students should learn to assess the balance between text and images: is there a need any special software to view the information?
- Search option—Students should pay attention to keyword searching (useful when the student does not know the exact name of an author, title or subject heading used in a system).
- Students should learn Boolean searching (use of the applications of Boolean connectors such as AND, OR, NOT) when finding information.
- Search results—Students should read the main points from the search lists, as the first search result may not be the best result.

#### **9.2.4 Network accessibility / Digital divide**

Network accessibility and digital divide is a critical barrier for most people who live in Malaysia, with the Internet connectivity in Malaysia. School children claim this is the main challenges that they faced during their Internet information-seeking process in school setting. Despite government initiatives and the strong emphasis put on multimedia, the levels of broadband usage have remained relatively low (Yong, 2003). The Internet is not widely accessible in all parts of the country especially in geographically isolated regions due to inadequate ICT infrastructure (Siddiquee, 2008). Furthermore, poor infrastructure, including the lack of electricity, exists in many parts of Malaysia and this creates challenges to Internet use. In contrast, this is not the case for Australian school children. Network accessibility has become an important issue to both countries, especially Malaysia, as teaching and learning processes have embedded information and communication technologies (ICT) into the curriculum in schools.

#### **9.2.5 Social effects**

The information-seeking process is based on specific tasks that require students to develop a number of social skills such as interaction/discussion with peers, interaction/discussion with teachers, and interaction/discussion with parents. While the tasks themselves require students to seek information on the Internet, issues of clarification and judgement are discussed with peers, teachers and parents in order to select the best/most suitable option/choice. The interaction expands their social horizons as well as their social networking skills and does not limit them to discussion with single parties alone (peers, teachers or parents). In addition to widening their social horizons and interactive communication skills, students develop independence in exploring and seeking out information from the Internet. Their independence grows as their confidence grows and as personal judgements are made in seeking and deciding on the appropriate materials needed to accomplish their task or goals. Students' sense of independence expands further

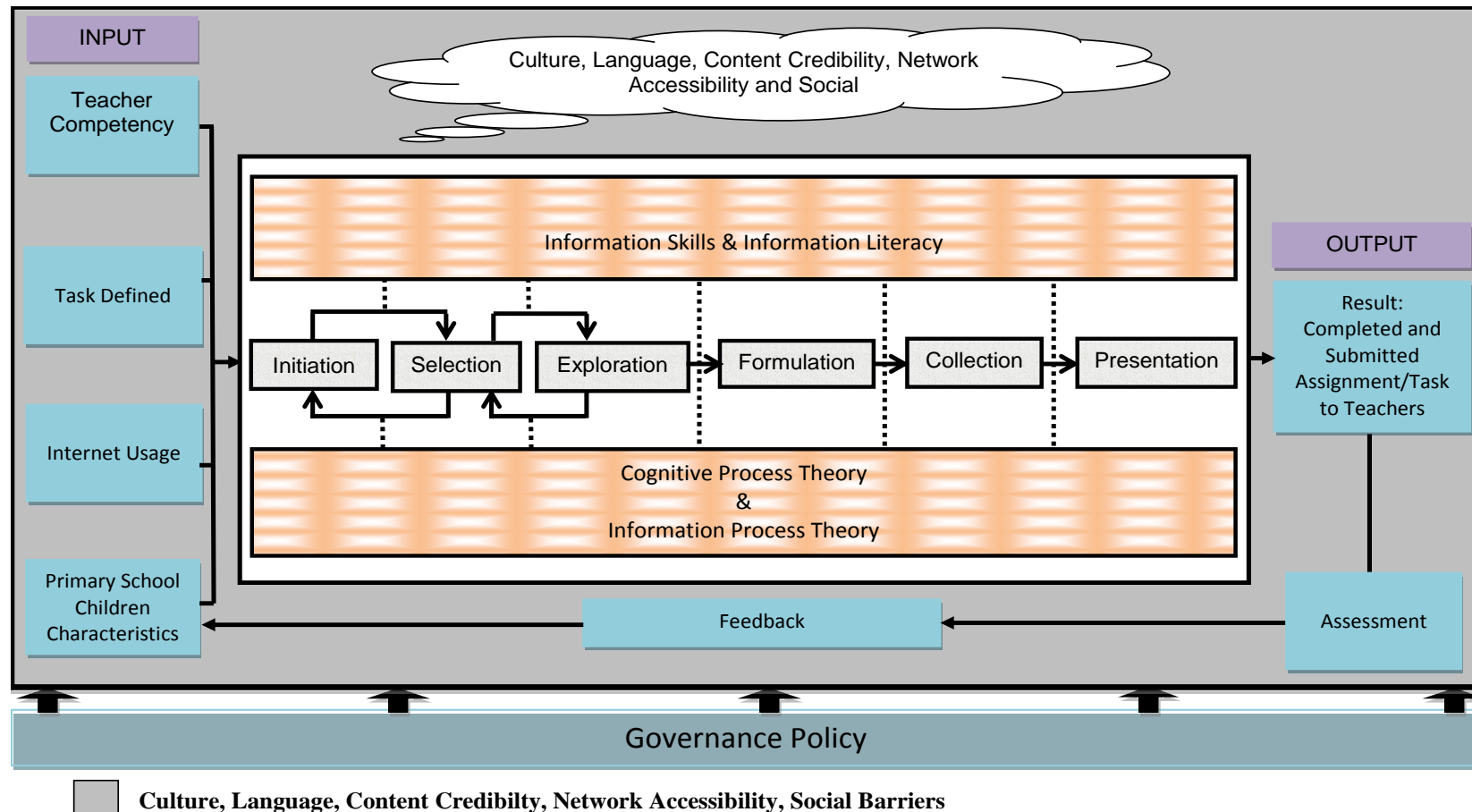
when they can discuss, argue and defend the decisions and choices they have made regarding a certain piece of information.

### **9.2.6 Government Policy**

In contrast to the Australian model, the Malaysian education system is more dominantly examination oriented in relation to assessment and focuses on grades achieved (Jegade, 2000). Malaysia has three levels of formal government examination, and students are assessed accordingly. Emphasis on good grades is a significant difference between Asian students and students from Western societies where the focus is on the teaching-learning process (Churton, 2008). In Australia, students use the Internet to enhance and support the learning input; whereas, in Malaysia, the Internet is used as a tool rather than as an integrated learning system.

The research showed that there are key barriers to the use of the Internet in information-seeking processes. These were culture, language, content credibility, the digital divide, social effects and government policy. These new elements have been added to the original Kuhlthau model (1993). The modified form of the model is shown in Figure 9.1.





**Figure 9.1: Modified model of information-seeking process**

### 9.3 Contribution to Theory

As an extension of Kuhlthau's model, the research design emphasised the input and output of the information-seeking process. The input elements refer to primary school children's characteristics, the task, Internet usage and teacher. The output elements refer to the results that are derived from the completion of these assignments or tasks. From the teachers' perspectives, students need to get feedback about their completed tasks or submitted assignments in order to improve their learning process when using the Internet.

This study identified some different findings to those described by Kuhlthau (1993). Kuhlthau worked mainly with adults and secondary school students, rather than children in primary schools, and dealt with three perspectives: the affective (feelings), the cognitive (thoughts), and the physical (actions). However, in the present study, from the teachers' point of view, only the cognitive and physical stages were relevant to the information-seeking processes for school children in order to complete their assignments. The teachers focussed more on the actions associated with information-seeking processes as being most relevant to learning; that is, actions such as how to use the Internet, and how to synthesise, organise and evaluate the information found. The revisited model of the information-seeking process was shown above in Figure 9.1.

### 9.4 Contribution to Practice

In comparing the two educational models in Malaysia and Australia, it became apparent that one important influence not mentioned in the Kuhlthau model was the influence of culture and language differences. For example, the influence of culture lies in the social structure of both societies, one of which is developed and the other which is part of a progressing nation. Cultural differences can be seen from two points of view: language perspectives and socio-economic status. This is consistent with the argument presented by Bentley (2005) highlighting that many

students from high context culture countries (such as Asia) have difficulty using online courses prepared by low context culture countries, such as the United States or Australia, due to language differences.

In contrast to the Australian model, the Malaysian education system is more dominantly examination oriented in relation to assessment. Malaysia has three levels of formal government examination, and students are assessed accordingly. In Australia, students use the Internet to enhance and support learning input. In Malaysia, the Internet is used as a tool rather than as an integrated learning system. The Ministry of Education in Malaysia should provide and create relevant sites for the improvement of the Malay and English Language subjects using the Internet as one of the teaching and learning methods more successfully. At the same time, Malay and English Language teachers should participate in ICT and information literacy training to gain more competencies and become better able to guide and monitor their students accordingly. This would also reduce some of the teachers' technology stress. Such stress is caused by the inability to cope with the computer technology in a constructive manner. Teachers may also need to collaborate with professional teacher librarians in order to complete the complex processes of information seeking from the Internet (Enochsson, 2005). The relevant government ministries in both Malaysia and Australia should employ professional teacher librarians to manage teaching and learning, collection development (product and services), curriculum involvement, management and ICT development of the curriculum (information literacy skills).

The teachers from both countries needed to collaborate with the teacher librarians or media teachers to gain their help in providing children with information-seeking skills, and has been discussed in Chapter 3. This is because teacher librarians have skills in providing and implementing information literacy programs and services to support the teaching and learning process. According to the Australian School Library Association (ASLA), a teacher librarian "is an individual who holds both recognised teaching qualifications and qualifications in librarianship". (<http://www.slaq.org.au/what-teacher-librarian>). The role of the teacher librarian is important to support the teaching and learning process in

schools through their teaching, understanding of the curriculum and information management. However, a study by Kamal and Othman (2012) revealed that not all schools in Malaysia employ a qualified teacher librarian and often teachers without qualified professional library or information science training manage their school resource centre. In 2006, the Malaysian Ministry of Education started appointing teachers as teacher librarians or media teachers in all schools. Teachers who had been appointed were given a reduced teaching load and were expected to function as professional library managers (Kamal & Othman, 2012). Fatimah, (2003) claimed that only 36% of teacher librarians in Malaysia had undergone short courses of 3 months or equivalent to 35-45 hours in library management. A study by Tan and Singh (2008) found that the training in school resource centre management was inadequate for these teachers to manage the school resource centre. The lack of qualified teacher librarians as main instructors is an indirect main constraint for the students to access the right resources for their assignments (Abuzaid & Singh, 2007). This statement, supported by Kamal and Othman (2012), indicates that the impact of school library programmes on academic performance supports the need for professionally trained teacher librarians. According to Madden et al. (2007), in their study of 13,123 students in Ohio, the students themselves claimed that their school libraries played an important and active role in their learning processes, including showing them the electronic resources.

In the two Victoria schools that been investigated, qualified librarians or teacher aids came twice a week to help manage the school resource centre. From the interview session with teachers, qualified teacher librarians only came twice a week due to budget constraints. Australian teachers claimed that this is not so much an issue because at the same time they get support from ICT teachers and also literacy teachers. As mentioned in Chapter 4, schools in the Victorian government education system have been provided with ICT teachers to teach ICT as one subject, and one of the schools investigated has appointed a literacy teacher. The role of the literacy teacher is to make sure students who have been identified by classroom teachers as lacking literacy skills have one session

(reading) with her every morning before the classes start. This helps students to improve their literacy skills.

This research makes an original contribution to knowledge including recommendations for both countries for the use of information technology specialists in the design elements of information retrieval systems for primary school children. Gilut and Nielsen (2007) outlined categories of children's design guidelines which included providing instruction, and explicit directions, using icons and systems which are clear, and creating meaningful categories and naming conventions. If such guidelines were in place, the students in this study would have benefitted, particularly those with challenged by the English language.

Furthermore, from my observations, the reason the majority of students use Google is due to Google providing the menu button "Do you mean" for spelling error and a summary of information of sites that they want to choose from the search results. This would also support the vision of the Ministries of Education in Australia and Malaysia, and also the Educational Technology Division in Malaysia towards upgrading the current School Resource Centres to become Electronic Resource Centres that promote information seeking through the use of current information retrieval systems in the teaching and learning process in Malaysia.

## **9.5 Limitations of the Study**

The findings from this exploratory study provide benefits for the development of the information-seeking information process in Malaysia and Australia. This study also provides findings that are beneficial to teachers, system analyst designers and Ministries of Education regarding how to improve and strengthen their role in supporting the information-seeking process using the Internet by students. However, the present study had limitations that need to be highlighted.

This research only involved four (4) schools due to time constraints and the fact that there are only two primary level Smart Schools in Malaysia. The Smart Schools are learning institutions that use information age tools and technology in teaching and learning processes as well as school management. The use of technology in teaching and learning was Initiative One of the seven flagship applications that were part of Malaysia's Multimedia Super Corridor project.

The time allocated for the data collection, through the survey, observations and interviews for both countries within five months, was another constraint that the researcher faced. This is because the researcher encountered difficulties in setting up appointments with teachers and gaining approval from the relevant Departments of Education, school principals and consent from parents since the students were below 18 years old.

## **9.6 Future Research Directions**

This study has shed some light on how primary school children seek information from the Internet for academic purposes in Malaysia and Australia. One area of further research that could be considered is the measurement of the effectiveness of the information-seeking process undertaken by the students based on assessment of their assignments. In the present study, this measure could not be carried out as no evaluations of the assessment were undertaken by the teachers in both countries.

## **9.7 Summary**

In summary, in order to identify the information-seeking process of the Malaysian and Australian school children, the methods of observation, interview and survey were employed. The study attempted to provide a holistic view of the current trends or practices in how primary school children sought information. As an extension of Kuhlthau's model, the research design emphasised the elements of input and output in the information-seeking process. The function of the Internet cannot be denied. It allows fast and easy access to a massive information source in which, if the information is used effectively, learning can become effective. In this case, teachers play a critical role in assisting students to manage the information sought and retrieved. As one of the teachers in the study pointed out, "as primary school children are born in the age of technology, we should open and share the information and knowledge from the Internet with them. Let them explore, but we as the teacher need to give proper guidance and help them in reviewing the information" (AUST6). Future research in further identifying patterns and needs in information-seeking processes and techniques using the Internet can be expanded from this research in order to formulate and enhance the education of primary school children.

## References

- Abels, E., & Danuta, A. N. (2004). Information seekers' perspectives of libraries and librarians. *Advances in Librarianship*, 28, 151-170.
- Abuzaid, R. A., & Singh, D. (2007). A framework for elibrary services to support the elearning environment in a secondary school: A case study. *Proceedings of 36th annual conference of the international association of school librarianship*, Taipei, Taiwan.
- Agosto, D. E., & Hughes-Hassell, S. (2005). People, places, and questions: An investigation of the everyday life information-seeking behaviors of urban young adults. *Library & Information Science Research*, 27(2), 141-163.
- Allington, R. L. (2001). *What really matters for struggling readers: designing research-based programs*. New York: Addison Wesley.
- Amaratunga, D., Baldy, D., Sarshar, M., & Newton, R. (2002). Quantitative and qualitative research in the built environment: application of mixed research approach. *Work Study*, 51(1), 17-31.
- American Library Association. (1989). *Presidential committee on information literacy: Final report*. Chicago: ALA. Retrieved from <http://www.ala.org/acrl/legalis.html>
- Ashling, J. (2008). We're all members of the Google generation. *Information Today*, 25(3), 22.
- Australian School Library Association. (2004) *Policy Statement - Teacher Librarians in Australia*. Retrieved from [http://www.asla.org.au/policy/p\\_tlaust.htm](http://www.asla.org.au/policy/p_tlaust.htm)
- Azhar M. A., Azharudin M. D., Suffian M., & Zulkanain, A. R. (2000). *Islamic Civilization and Asian Civilization*. Shah Alam: Penerbit Fajar Bakti
- Banks, J. A. (1993). Multicultural education: Historical development, dimensions, and practice. *Review of Research in Education*, 19, 3-49.
- Barnouw, V. (1963). *Culture and personality*. Homewood, Illinois: Dorsey.



- Barratt, M., Choi, T. Y., & Li, M. (2011). Qualitative case studies in operations management: trends, research outcomes, and future research implications. *Journal of Operations Management*, 29(4), 329-342.
- Barrett, P. L. (2012). *Information-seeking processes of fourth grade students using the Internet for a school assignment*. New York: Columbia University.
- Baxter, P., & Jack, S. (2008). Qualitative case study methodology: Study design and implementation for novice researchers. *The Qualitative Report*, 13(4), 544-559.
- Beaty, J. J. (2010). *Observing development of the young child* (7th ed.). Upper Saddle River, N.J: Merrill.
- Belkin, N.J., Brooks, H.M., & Oddy, R.N. (1982). ASK for information retrieval. *Journal of Documentation*, 38, 61-71.
- Bentley, J. P., Tinney, M. V., & Chia, B. H. (2005). Intercultural Internet based learning: Know your audience and what they value. *Educational Technology Research and Development*, 53(2), 117-127.
- Berkowitz, B. (2002). Moving every child ahead: The Big6 success strategy. *Multimedia Schools*, 9, 17-22.
- Bernal, J. D. (1958). The transmission of scientific information: a user's agenda. *International Conference on Scientific Information*, Washington, DC, National Academy of Sciences - National Research Council.
- Bilal, D. (1999). Web search engines for children: A comparative study and performance evaluation of "Yahooligans!", Ask Jeeves for Kids", and "Super Snooper". *Proceedings of the Association of Information Science (ASIS) Annual Meeting*, 36, 70-83.
- Bilal, D. (2000). Children's use of the Yahooligans! Web search engine: I. Cognitive, physical, and affective behaviors on fact-based tasks. *Journal of the American Society for Information Science*, 51(7), 646-665.
- Bilal, D. (2001). Children's use of the Yahooligans! Web search engine: II. Cognitive and physical behaviors on research tasks. *Journal of the American Society for Information Science and Technology*, 52(2), 118-136.

- Bilal, D. (2002). Children's use of the Yahoo!igans! Web search engine. III. Cognitive and physical behaviors on fully self-generated search tasks. *Journal of the American Society for Information Science and Technology*, 53(13), 1170-1183.
- Bilal, D. (2005). Children's information seeking and the design of digital interfaces in the affective paradigm. *Library Trends*, 54(2), 197-208.
- Bilal, D., & Kirby, J. (2002). Differences and similarities in information seeking: children and adults as Web users. *Information Processing and Management*, 38(5), 649-670.
- Bilal, D., & Watson, J. (1998). Children's paperless projects: Inspiring research via the Web. *64th IFLA General Conference*, Amsterdam, 16-21.
- Birukou, A., Blanzieri, E., Giorgini, P., & Giunchiglia, F. (2013). A formal definition of culture. In *Models for Intercultural Collaboration and Negotiation* (pp. 1-26). Springer, Netherlands.
- Björklund, A. (2000). Education policy and returns to education. *Swedish Economic Policy Review*, 1, 71-105.
- Bloom, B. S., & Krathwohl, D. (1956). Taxonomy of educational objectives: The classification of educational goals. Philadelphia, PA: Susan Fauer Company.
- Bloom, B. S., & Krathwohl, D. (1956). Bloom's Taxonomy. Retrieved from [http://ww2.odu.edu/educ/roverbau/Bloom/blooms\\_taxonomy.htm](http://ww2.odu.edu/educ/roverbau/Bloom/blooms_taxonomy.htm)
- Borgman, C. L., Hirsh, S. G., Walter, V. A., & Gallagher, A. L. (1995). Children's searching behavior on browsing and keyword online catalogs: The Science Library Catalog project. *Journal of the American Society for Information Science*, 46, 663-684.
- Borgman, C. L., Smart, L. J., Millwood, K. A., Finley, J. R., Champeny, L., Gilliland, A. J., & Leazer, G. H. (2005). Comparing faculty information seeking in teaching and research: Implications for the design of digital libraries. *Journal of the American Society for Information Science and Technology*, 56(6), 636-657.
- Boyatzis, R. E. (1998). *Transforming qualitative information: Thematic analysis and code development*. Thousand Oaks, California: Sage.

- Branch, J. L. (2003). Instructional intervention is the key: Supporting adolescent information seeking. *School Libraries Worldwide*, 9(2), 47-61.
- Broch, E. (2000). Children's search engines from an information search process perspective. *School Library Media Research*, 3. Retrieved from <http://www.ala.org/ala/aasl/aaslpubsandjournals/slmrb/slmrcontents/volume32000/childrens.htm>
- Bryman, A. (2004). *Social research methods* (2nd Ed.). New York: Oxford University Press.
- Buffington, M. L. (2004). Using the Internet to develop students' critical thinking skills and build online communities of teachers: A review of research with implications for museum education. Doctoral dissertation, Ohio State University.
- Burns, N., & Grove, S. K. (2001). *The practice of nursing research*. New York: Oxford University Press.
- Bystrom, K. & Jarvelin, K. (1995). Task complexity affects information seeking and use. *Information Processing & Management*, 31(2), 191-213.
- Bystrom, K. & Hansen, P. (2005). Conceptual framework for tasks in information studies. *Journal of the American Society for Information Science and Technology*, 56(10), 1050-1061.
- Callahan, E. (2005). Cultural similarities and differences in the design of university web sites. *Journal of Computer-Mediated Communication*, 11(1), 239-273.
- Case, D. O. (Ed.). (2012). *Looking for information: A survey of research on information seeking, needs, and behavior*. Bingley, UK: Emerald Group Publishing.
- Central Intelligence Agency (US). (2011). *The world factbook*. Retrieved from <https://www.cia.gov/library/publications/the-world-factbook/geos/np.html>
- Chappell, C. A. (2004). Post-secondary correctional education and recidivism: A meta-analysis of research conducted. *Journal of Correctional Education*, 55(2), 148-169.
- Choo, C. W., Detlor, B., & Turnbull, D. (1999). Information seeking on the Web - An integrated model of browsing and searching. *Proceedings of the 62nd*

- Annual Meeting of the American Society of Information Science*, Washington, DC.
- Chung, J. S., & Neuman, D. (2006). High school students' information seeking and use for class projects. *Journal of the American Society for Information Science and Technology*, 58(10), 1503-1517.
- Churton, M. (2003). Transitioning to e-learning: Pedagogical and support considerations. Keynote address, *17th AAOU Annual Conference*, Bangkok.
- Churton, M. W. (2008). *Pedagogical considerations for online (e-learning) teaching-learning*. Tampa, Florida: University of South Florida.
- Clark, R. C., & Taylor, D. (1994). The causes and cures of learner overload. *Training*, 31(7), 40-43.
- Cline, R. & Haynes, K. (2001). Consumer health information seeking on the Internet: the state of the art. *Health Education Research*, 16(6), 671-692.
- Coiro, J., & Dobler, E. (2007). Exploring the online reading comprehension strategies used by sixth-grade skilled readers to search for and locate information on the Internet. *Reading Research Quarterly*, 42(2), 214-257.
- Coiro, J. (2003). Reading comprehension on the Internet: Expanding our understanding of reading comprehension to encompass new literacies. *Reading Online*. [Article reprinted from *The Reading Teacher*, 56, 458-464]. Retrieved from [http://www.readingonline.org/electronic/elec\\_index.asp?HREF=/electronic/r/t/2-03\\_Column/index.html](http://www.readingonline.org/electronic/elec_index.asp?HREF=/electronic/r/t/2-03_Column/index.html)
- Cole, C. (2012). *Information need: A theory connecting information search to knowledge formation*. New Jersey: Medford.
- Collins, K. M., & O'Cathain, A. (2009). Introduction: Ten points about mixed methods research to be considered by the novice researcher. *International Journal of Multiple Research Approaches*, 3(1), 2-7.
- Creswell, J.W. & Plano Clark, V. L. (2007). *Designing and conducting mixed methods research*. Thousand Oaks, California: Sage.
- Creswell, J. W. (2008). *Research design: Qualitative, quantitative, and mixed methods approaches*. Thousand Oaks, California: Sage.

- Creswell, J. W., & Plano Clark, V. (2011). *Designing and conducting mixed methods research*. Thousand Oaks, California: Sage.
- Creswell, J. W., Clark, V. L. P., Gutmann, M. L., & Hanson, W. E. (2003). Advanced mixed methods research designs. In A. Tashakkori & C. Teddie (Eds.), *Handbook of mixed methods in social and behavioral research* (pp. 209-240). Thousand Oaks, California: Sage.
- Curriculum Development Centre. (2005). *Integrated curriculum for primary schools*. Ministry of Education Malaysia. Retrieved from [http://www.moe.gov.my/bpk/sp\\_hsp/sains/kbsm/hsp\\_add\\_science\\_f4.pdf](http://www.moe.gov.my/bpk/sp_hsp/sains/kbsm/hsp_add_science_f4.pdf)
- Daniel, L., Khan, M., Holman, C. A., & Canton, E. (Eds.). (2008). *Far East and Australasia 2009* (40th Ed.). Abingdon, Oxon: Routledge.
- DeMey, D. (1977). The relevance of the cognitive paradigm for information science. *Proceedings of the International Research Forum in Information Science*, 271-331.
- Department of Education and Early Childhood Development. (2008). *VicSmart - Directions & Priorities – About the Department*. Retrieved from <http://www.education.vic.gov.au/about/directions/vicsmart/default.htm>
- Department of Education and Early Childhood Development. (2011). *Annual report*. Retrieved from <http://www.education.vic.gov.au/Documents/about/department/201112decdannualreport.pdf>
- Department of Immigration and Citizenship. (2006). *The People of Australia - Statistics from the 2006 Census*. Canberra: Commonwealth of Australia.
- Dervin, B. (1998). Sense-making theory and practice: An overview of user interests in knowledge seeking and use. *Journal of Knowledge Management*, 2(2), 36-46.
- De Winter, J. C., & Dodou, D. (2010). Five-point Likert items: t test versus Mann-Whitney-Wilcoxon. *Practical Assessment, Research & Evaluation*, 15(11), 1-12.
- Descombe, M. (2003). *The good research guide: For small-scale social projects*. Maidenhead, PA: Open University.

- Dormann, C., & Chisalita, C. (2002). Cultural values in web site design. *Proceedings of the 11th European Conference on Cognitive Ergonomics*, Catania, Italy. Retrieved from <http://www.cs.vu.nl/~claire/Hofstede-dormann.pdf>
- Dresang, E. T. (1999). More research needed: Informal information-seeking behavior of youth on the Internet. *Journal of the American Society for Information Science*, 50(12), 1123-1124.
- Dresang, E. T. (2005). The information-seeking behavior of youth in the digital environment. *Library Trends*, 54(2), 178-196.
- Druin, A. (2005). What children can teach us: Developing digital libraries for children with children. *Library Quarterly*, 75(1), 20-41.
- Druin, A., Foss, E., Hatley, L., Golub, E., Guha, M. L., Fails, J., & Hutchinson, H. (2009). How children search the Internet with keyword interfaces. *Proceedings of the 8th International Conference on Interaction Design and Children*, Association for Computing Machinery (ACM), 89-96.
- Dubrin, A. J. (2004). *Human relations for career and personal success*. New Jersey: Pearson Prentice Hall.
- Dutta, R. (2009). Information needs and information-seeking behavior in developing countries: A review of the research. *International Information & Library Review*, 41(1), 44-51.
- Eastin, M.J., & LaRose, R. (2000). Internet self-efficacy and the psychology of the digital divide. *Journal of Computer-Mediated Communication*, 6(1). Retrieved from [www.ascusc.org/jcmc/vol6/issue1/eastin.html](http://www.ascusc.org/jcmc/vol6/issue1/eastin.html)
- Edge, J. (2004). Professional development among troops. *Essential Teacher*, 1(3), 46-47.
- Edyburn, D. L. (1998). Part III: A map of the technology integration process. *Closing The Gap*. Retrieved from <http://www.uwm.edu/~edyburn/IntegrationMap.pdf>
- Eisenhardt, K. M., & Graebner, M. E. (2007). Theory building from cases: Opportunities and challenges. *Academy of Management Journal*, 50(1), 25-32.

- Ellis, D. (1989). A behavioural approach to information retrieval system design. *Journal of Documentation*, 45(3), 171-212.
- Enochsson, A. (2005). The development of children's Web searching skills: A nonlinear model. *Information Research*, 11(1), 11-12.
- Ericsson, K. A., & Simon, H. A. (1984). *Protocol analysis: Verbal reports as data*. Cambridge, MA: Bradford Books/MIT Press.
- Eskola, E. L. (1999). University students information seeking behaviour in a changing learning environment – How are students information needs, seeking and use affected by new teaching methods. *Information Research*, 4(3), 4-2.
- Fatimah, J. (2002). School libraries in Malaysia. *International Association of School Librarianship (IASL) Conference*, Petaling Jaya, Malaysia.
- Fidel, R., Davies, R. K., Douglass, M. H., Holder, J. K., Hopkins, C. J., Kushner, E. J., Miyagishima, B. K., & Toney, C. D. (1999). A visit to the information mall: Web searching behavior of high school students. *Journal of the American Society for Information Science*, 50(1), 24-37.
- Fritscher, L. (2011). *Cognitive theory*. About.com. Retrieved from <http://www.phobias.about.com/od/glossary/g/cognitivethedef.htm>
- Forehand, M. (2010). Bloom's taxonomy: Original and revised. In M. Orey (Ed.), *Emerging perspectives on learning, teaching and technology*. Retrieved from <http://projects.coe.uga.edu/epltt/>
- Foss, E., Druin, A., Brewer, R., Lo, P., Sanchez, L., & Golub, E. (2012). Children's search roles at home: Implications for designers, researchers, educators, and parents. *Journal of the American Society for Information Science and Technology*, 63(3), 558-573.
- Gaito, J. (1980). Measurement scales and statistics: Resurgence of an old misconception. *Psychological Bulletin*, 3, 564-567.
- Ganley, C. M., Vasilyeva, M., Casey, B. M., & Dearing, E. (2009). Measurement skills in low-income elementary school students: Exploring the nature of gender differences. *Cognition and Instruction*, 27(4), 401-428.

- Gilutz, S., & Nielsen, J. (2007). *Usability of websites for children*. Fremont, California: Nielsen Norman Group. Retrieved from <http://www.NNgroup.com/reports/kids>
- Greene, S., Marchionini, G., Plaisant, C., & Shneiderman, B. (2000). Previews and overviews in digital libraries: Designing surrogates to support visual information seeking. *Journal of the American Society for Information Science*, 51(4), 380-393.
- Guba, E. G., & Y. S. Lincoln. (1994). *Competing paradigms in qualitative research - Handbook of qualitative research*. Thousand Oaks, California: Sage.
- Guion, L. A., Diehl, D. C., & McDonald, D. (2011). *Triangulation: Establishing the validity of qualitative studies*. Gainesville, Florida: University of Florida.
- Gunn, H. (2002). Searching the web. *Teacher Librarian*, 30(1), 52.
- Gunn, H., & Hepburn, G. (2003). Seeking information for school purposes on the Internet. *Canadian Journal of Learning and Technology*, 29(1).
- Halavais, A. (2009). *Search engine society*. Cambridge: Polity Press.
- Hall, E. T. (1977). *Beyond culture*. Garden City, NY: Anchor Press.
- Hallinger, P., & Heck, R. H. (1998). Exploring the principal's contribution to school effectiveness: 1980- 1995. *School Effectiveness and School Improvement*. 9(2), 32-41. Retrieved from [http://www.tandfonline.com/doi/pdf/10.1080/0924345980090203#.UrLPp-Iw\\_rk](http://www.tandfonline.com/doi/pdf/10.1080/0924345980090203#.UrLPp-Iw_rk)
- Heinstrom, J. (2003). Five personality dimensions and their influence on information behaviour. *Information Research*, 9(1), 1-9.
- Hertzum, M., & Pejtersen, A.M. (2000). The information-seeking practices of engineers: searching for documents as well as for people. *Information Processing & Management*, 36(5), 761-778.
- Hess, B. (1999). Graduate student cognition during information retrieval using the World Wide Web: a pilot study. *Computers & Education*, 33(1), 1-13.



- Hirsh, S. G. (1999). Children's Relevance Criteria and Information Seeking on Electronic Resources. *Journal of The American Society for Information Science*, 50(14), 1265-1283.
- Hofstede, G. H. (2001). *Culture's consequences: Comparing values, behaviors, institutions and organizations across nations*. Thousand Oaks, California: Sage.
- Hofstede, G. (2011). Dimensionalizing cultures: the Hofstede model in context. *Online Readings in Psychology and Culture*, 2(1), 8.
- Hofstede, G. (2007). What are Hofstede's five cultural dimensions? [Online] Retrieved from [http://www.eurib.org/fileadmin/user\\_upload/Documenten/PDF/Identiteit\\_en\\_Imago\\_ENGELS/z\\_-\\_De\\_vijf\\_cultuurdimensies\\_van\\_Hofstede\\_\\_EN\\_.pdf](http://www.eurib.org/fileadmin/user_upload/Documenten/PDF/Identiteit_en_Imago_ENGELS/z_-_De_vijf_cultuurdimensies_van_Hofstede__EN_.pdf)
- Hofstede, G. (1986). Cultural differences in teaching and learning. *International Journal of Intercultural Relations*, 10, 301-320.
- Hofstede, G., & Hofstede, G. J. (1991). *Cultures and organizations: Software of the mind*. London: McGraw-Hill.
- Hofstede, G., & Hofstede, G. J. (2005). *Cultures and organizations, software of the mind, intercultural cooperation and its importance for survival* (2nd ed.). New York: McGraw-Hill.
- Holliday, W. and Li, Q. (2004). Understanding the millennials: updating our knowledge about students to improve library instruction. *Reference Services Review*, 32(4), 356-366.
- Hutchinson, H. B., Druin, A. & Bederson, B.B. (2007). Supporting elementary-age children's searching and browsing: Design and evaluation using the international children's digital library. *Journal of the American Society for Information Science and Technology*, 58(11), 1618-1630.
- Information Malaysia Yearbook. (2002). Malaysia Yearbook, Kuala Lumpur, Malay Mail.
- Internet (2012). Retrieved from [http://compnetworking.about.com/od/internetaccessbestuses/l/bldef\\_internet.htm](http://compnetworking.about.com/od/internetaccessbestuses/l/bldef_internet.htm)

- Jegede, O. (2000). Communique for the Workshop on Distance Education 27-29 September 2000, Abuja, Nigeria, ECOWAS Secretariat.
- Jochmann-Mannak, H. E., Huibers, T. W. C., Lentz, L. R., & Sanders, T. J. M. (2010). Children searching information on the Internet: Performance on children's interfaces compared to Google. Retrieved from <http://purl.utwente.nl/publications/72475>
- Joo, J.E. (1999). Cultural issues of the Internet in classrooms. *British Journal of Educational Technology*, 30(3), 245–250.
- Johari, A., Bentley, J. P., Tinney, M. V., & Chia, B. H. (2005). Intercultural Internet-based learning: Know your audience and what it values. *Educational Technology Research and Development*, 53(2), 117-127.
- Johnson, J. D. (2003). On contexts of information seeking. *Information Processing & Management*, 39 (5), 735-760.
- Johnson, J.D., Donohue, W.A., Atkin, C.K. & Johnson, S. (1995). A comprehensive model of information seeking. *Science Communication*, 16, 274–303.
- Kail, R. V. (2004). Children and their development (3rd Ed.). Upper Saddle River, NJ: Pearson.
- Kaisser, M., Hearst, M. A., & Lowe, J. B. (2008). Improving search results quality by customizing summary lengths. *Proceedings of the 46th Annual Meeting of the Association for Computational Linguistics*, 701-709.
- Kamal, M. A., & Othman, N. (2012). The role of library and media teachers in Malaysian school resource centres. *Journal of Education and Practice*, 3(15), 120-126.
- Katz, I. R. (2013). Testing information literacy in digital environments: ETS's iSkills assessment. *Information Technology and Libraries*, 26(3), 3-12.
- Kitchner, K. (1983). Cognition, metacognition, and epistemic cognition. *Human Development*, 26(4), 222-232.
- Komlodi, A., & Carlin, M. (2004). Identifying cultural variables in information-seeking. *Proceedings of the Tenth Americas Conference on Information Systems*, 68.

- Kotler, P., Handler, D., & Rein, I. (1997). *Marketing places*. New York, NY: The Free Press.
- Krikelas, J. (1983). Information-seeking behavior: Patterns and concepts. *Drexel Library Quarterly*, 19, 5-20.
- Kroeber, A. L., & Kluckhohn, C. (1952). *Culture: A critical review of concepts and definitions*. Cambridge, Mass: Peabody Museum of Archaeology & Ethnology, Harvard University.
- Kuhlthau, C. C. (1991). Inside the search process: Information seeking from the user's perspective. *Journal of the American Society for Information Science*, 42(5), 361-371.
- Kuhlthau, C. C. (1993). A principle of uncertainty for information seeking. *Journal of Documentation*, 49(4), 339-355.
- Kuhlthau, C. C. (2004). *Seeking meaning: A process approach to library and information services*. Westport, CT: Libraries Unlimited.
- Kuhlthau, C.C. (1996). The concept of a zone of intervention for identifying the role of intermediaries in the information search process. *Proceedings of the 59th Annual Meeting of the American Society for Information Science*, 30, 91-94.
- Kuhlthau, C. C. (1988). Developing a model of the library search process: Cognitive and affective aspects. *Reference Quarterly*, 28, 232-243.
- Kuhlthau, C., Maniotes, L. & Caspari, A. (2007). *Guided inquiry: learning in the 21st century*. Westport, CT: Libraries Unlimited.
- Kuhlthau, C.C., Heinström, J., & Todd, R. J. (2008). The 'information search process' revisited: is the model still useful? *Information Research*. Retrieved from <http://InformationR.net/ir/13-4/paper355.html>
- Kuiper, E., Volman, M., & Terwel, J. (2008). Integrating critical Web skills and content knowledge: Development and evaluation of a 5th grade educational program. *Computers in Human Behavior*, 24 (3), 666-692.
- Large, A. (2004). Information seeking on the Web by elementary school students. *Youth Information-Seeking Behavior: Theories, Models, and Issues*. Lanham, MD: Scarecrow Press.

- Large, A., & Beheshti, J. (2000). Primary School Students' Reactions to the Web as a Classroom Resource. *Proceedings of the Canadian Association for Information Science; American Society for Information Sciences*, 51(12), 1069-1080.
- Large, A., & Beheshti, J. (2000). The web as a classroom resource: Reactions from the users. *Journal of the American Society for Information Science*, 51(12), 1069-1080.
- Large, A., Beheshti, J., & Breuleux, A. (1998). Information seeking in a multimedia environment by primary school students. *Library & Information Science Research*, 20(4), 343-376.
- Large, A. Beheshti, J., & Rahman, T. (2006). *Web portal design guidelines as identified by children through the processes of design and evaluation*. Retrieved from <http://hdl.handle.net/10760/8557>.
- Large, A., Beheshti, J., & Rahman, T. (2002). Design criteria for children's Web portals: The users speak out. *Journal of the American Society for Information Science and Technology*, 53(2), 79-94.
- Large, A., Beheshti, J., & Rahman, T. (2002). Gender differences in collaborative Web searching behavior: an elementary school study. *Information Processing and Management*, 38(3), 427-443.
- Large, A., Bowler, L., Beheshti, J., & Nessel, V. (2007). Creating Web portals with children as designers: Bonded design and the zone of proximal development. *McGill Journal of Education*, 42(1), 22.
- Lazonder, A. W., Biemans, H. J., & Wopereis, I. G. (2000). Differences between novice and experienced users in searching information on the World Wide Web. *Journal of the American Society for Information Science*, 51(6), 576-581.
- Le Bigot, L., & Rouet, J. F. (2007). The impact of presentation format, task assignment, and prior knowledge on students' comprehension of multiple online documents. *Journal of Literacy Research*, 39(4), 445-470.
- Leckie, G. J., Pettigrew, K. E., & Sylvian, C. (1996). Modeling the information seeking of professionals: a general model derived from research on

- engineers, health care professionals, and lawyers. *The Library Quarterly*, 161-193.
- Lee, S. J., & Chae, Y. G. (2007). Children's internet use in a family context: Influence on family relationships and parental mediation. *Cyber Psychology & Behavior*, 10(5), 640-644.
- Leech, N. L., & Onwuegbuzie, A. J. (2009). A typology of mixed methods research designs. *Quality & Quantity*, 43(2), 265-275.
- Leu, D. J. (1997). Caity's question: Literacy as deixis on the Internet (Exploring literacy on the Internet). *The Reading Teacher*, 51(1), 62-67.
- Leu, D. J., Kinzer, C. K., Coiro, J. L., & Cammack, D. W. (2004). Toward a theory of new literacies emerging from the Internet and other information and communication technologies. *Theoretical Models and Processes of Reading*, 5, 570-1613.
- Leydon, G. M., Boulton, M., Moynihan, C., Jones, A., Mossman, J., Boudioni, M., & McPherson, K. (2000). Cancer patients' information needs and information seeking behaviour: in depth interview study. *British Medical Journal*, 320, 909-913.
- Li, H., Kuo, C., & Russell, M.G. (1999). The impact of perceived channel utilities, shopping orientations, and demographics on the consumer's on-line buying behavior. *Journal of Computer-Mediated Communication*, 5(2). Retrieved from [www.ascusc.org/jcmc/vol5/issue2/hairong.html](http://www.ascusc.org/jcmc/vol5/issue2/hairong.html)
- Li, Y., Liu, Y., Zhang, L., Li, G., Xie, B., & Sun, J. (2007). An exploratory study of Web services on the Internet. *IEEE International Conference on Web Services*, 380-387.
- Leu, D. J., Zawilinski, L., Castek, J., Banerjee, M., Housand, B., Liu, Y., et al. (2007). What is new about the new literacies of online reading comprehension? In L. Rush, J. Eakle, & A. Berger (Eds.), *Secondary school literacy: What research reveals for classroom practices* (pp. 37-68). Urbana, IL: National Council of Teachers of English.
- Limberg, L., & Sundin, O. (2006). Teaching information seeking: relating information literacy education to theories of information behaviour. *Information Research*, 12, 9.

- Livingstone, S. M. (2003). The Changing Nature of Audiences: From the Mass Audience to the Interactive Media User. In A. Valdivia (Ed.), *The Blackwell Companion to Media Research*. Oxford: Blackwell.
- Livingstone, S. M. (2003). Children's use of the internet: Reflections on the emerging research agenda. *New Media and Society*, 5(2), 147-166.
- Lustig, M. W., & Koester, J. (2003). *Intercultural competence: Interpersonal communication across cultures* (4th ed.). Boston: Allyn & Bacon.
- Madden, A.D., Ford, N.J., Miller, D., & Levy, P. (2006). "Children's use of the internet for information seeking. What strategies do they use, and what factors affect their performance? *Journal of Documentation*, 62(6), 744-761.
- Madden, A.D., Ford, N.J., & Miller, D. (2007). Information resources used by children at an English secondary school. Perceived and actual levels of usefulness. *Journal of Documentation*, 63(3), 340-358.
- Mahmood K., & Mohammad, I. (2011). Prior knowledge and information-seeking behavior of PhD and MA students. *Library & Information Science Research*, 33(4), 331-335.
- Malaysian Administrative Modernisation and Management Planning Unit. (2002). *The Smart School roadmap: An educational odyssey*. Retrieved from [http://www.mscomalaysia.my/sites/default/files/pdf/publications\\_references/SMART\\_SCHOOL\\_ROADMAP\\_020506.pdf](http://www.mscomalaysia.my/sites/default/files/pdf/publications_references/SMART_SCHOOL_ROADMAP_020506.pdf)
- Mansor, N., & Ali, M. A. M. (1998). An exploratory study of organizational flexibility in Malaysia: a research note. *International Journal of Human Resource Management*, 9(3), 506-515.
- Marchionini, G. (1989). Information-seeking strategies of novices using a full-text electronic encyclopedia. *Journal of the American Society for Information Science*, 40(1), 54-66.
- Marchionini, G. (1995). *Information Seeking in Electronic Environments*. New York, NY: Cambridge University Press.
- Marchionini, G., & White, R. (2007). Find what you need, understand what you find. *International Journal of Human Computer Interaction*, 23(3), 205-237.

- McCarron, K. (2004). Young adults and information-seeking behavior: A review of the literature. *Information Resources and Services*, 3-39.
- McClure, C. R. (1994). Network literacy: a role for libraries? *Information Technology and Libraries*, 13(2), 115-125.
- McDevitt, T. M., & Ormrod, J. E. (2004). *Child development: Educating and working with children and adolescents* (2nd ed.). Upper Saddle River, NJ: Pearson Prentice Hall.
- McKnight, P. E., & Najab, J. (2010). *Mann-Whitney U Test*. Corsini Encyclopedia of Psychology.
- Merriam, S. (1998). *Qualitative research and case study applications in education*. San Francisco: Jossey-Bass.
- Metzger, M. J. (2007). Making sense of credibility on the Web: Models for evaluating online information and recommendations for future research. *Journal of the American Society for Information Science and Technology*, 58(13), 2078-2091.
- Miles, M. B., & Huberman, A. M. (1984). *Qualitative data analysis: a sourcebook of new methods*. Thousand Oaks, California: Sage.
- Milewski, A. E., & O'Sullivan, P. (2007). Information-seeking tools for global teams. *Workshop on Global Collaboration, ACM/Computer-Human Interaction SIG*.
- Miller, G. A. (2011). *Language and communication*. Chinchester, UK: John Wiley & Sons.
- Minudri, R. (1974). Library and information services for young adults and students. In C. A. Cuadra, & M. J. Bates (Eds.), *Library and information service needs of the nation: Proceedings of a conference on the needs of occupational, ethnic, and other groups in the United States* (pp. 155–161). Washington, DC.
- Miyazaki, A.D., & Fernandez, A. (2001). Consumer perceptions of privacy and security risks for online shopping. *Journal of Consumer Affairs*, 35 (1), 27-45.
- Moore, P. (2000). Primary school children's interaction with library media: Information literacy in practice. *Teacher Librarian*, 27(3), 7-11.

- Moore, P.A., & St George, A. (1991). Children as information seekers: the cognitive demands of books and library systems. *School Library Media Quarterly*, 19(3), 161-168.
- Mumtaz, S. (2001). Children's enjoyment and perception of computer use in the home and the school. *Computers & Education*, 36(4), 347-362.
- Myers, M. D. (2009). *Qualitative research in business & management*. Thousand Oaks, California: Sage.
- Nanna, M. J., & Sawilowsky, S. S. (1998). Analysis of Likert scale data in disability and medical rehabilitation research. *Psychological Methods*, 3(1), 55.
- National Education Policy. (2012). Malaysia Education Blueprint. Retrieved from <http://www.moe.gov.my/userfiles/file/PPP/Preliminary-Blueprint-Eng.pdf>
- Nesset, V. (2005). An exploratory study into the information seeking behaviour of grade-three students. *Proceedings of the Annual Conference of the Canadian Association for Information Science: Data, Information, and Knowledge in a Networked World*.
- Nesset, V. (2009). The information-seeking behavior of grade-three students in the context of a class project. Unpublished Dissertation, McGill University, Montreal, Quebec, Canada.
- Neulip, J. W. (2003). *Intercultural communication: A contextual approach*. Thousand Oaks, California: Sage.
- Neuman, W. (2006). *Social research methods: Qualitative and quantitative approaches* (6th ed.). Boston: Pearson.
- Newhagen, J.E., & Rafaeli, S. (1996). Why communication researchers should study the internet: a dialogue. *Journal of Communication*, 46, 4-13.
- Onwuegbuzie, A. J., & Leech, N. L. (2006). Linking research questions to mixed methods data analysis procedures. *The Qualitative Report*, 11(3), 474-498.
- Papacharissi, Z., & Rubin, A.M. (2000). Predictors of Internet use. *Journal of Broadcasting and Electronic Media*, 44, 175-96.
- Patton, M. Q. (1990). *Qualitative evaluation and research methods* (2nd Ed.). Thousand Oaks, California: Sage.



- Patton, M. Q. (2002). *Qualitative research and evaluation methods* (3rd Ed.). Thousand Oaks, California: Sage.
- Peterson, J. W. (2008). Networked generation youth's information seeking process: An examination of cognitive, affective, and physical information seeking behaviors and problem solving techniques. Dissertation for Phd., University of North Texas. Retrieved from [http://digital.library.unt.edu/ark:/67531/metadc6063/m2/1/high\\_res\\_d/dissertation.pdf](http://digital.library.unt.edu/ark:/67531/metadc6063/m2/1/high_res_d/dissertation.pdf)
- Piaget, J., & Inhelder, B. (1969). *The psychology of the child*. New York: Basic Books.
- Pickard, A. J. (2007). *Research methods in information*. Great Britain: Cromwell Press.
- Prensky, M. (2001). Digital natives, digital immigrants Part 2: Do they really think differently? *On The Horizon*, 9(6), 1-6.
- Punch, M. (1994). Politics and ethics in qualitative research. In N. K. Denzin & Y. S. Lincoln (Eds.), *Handbook of qualitative research* (pp. 83-97). Thousand Oaks, California: Sage.
- Rachman, Z. M., & Buchanan, J. (1999). *Effective tourism Web sites, Part 1: Literature review and features survey*. Hamilton, New Zealand: Department of Management Systems, University of Waikato.
- Ramirez, A., Walther, J.B., Burgoon, J.K., & Sunnafrank, M. (2002). Information-seeking strategies, uncertainty, and computer-mediated communication toward a conceptual model. *Human Communication Research*, 28, 212-28.
- Rifon, N.J., LaRose, R., & Choi, S. M. (2005). Your privacy is sealed: effects of web privacy seals on trust and personal disclosures. *Journal of Consumer Affairs*, 39(2), 339-362.
- Robbins, S. S., & Stylianou, A. C. (2002). A study of cultural differences in global corporate websites. *Journal of Computer Information Systems*, 42, 3-9.
- Robson, C. (1997). *Real world research: A resource for social scientist and practitioner researchers*. Oxford: Blackwell.

- Robson, C. (2002). *Real world research: A resource for social scientists and practitioner researchers* (2nd ed.). London: Blackwell.
- Rossmann, G. B., & Wilson, B. L. (1985). Numbers and Words: Combining quantitative and qualitative methods in a single large scale study. *Evaluation Review*, 9, 627-643.
- Rothman, A. (2003). America Online "Youth Wired" survey finds kids are online an average of four hour days a week: nearly 20% go online everyday. Retrieved from <http://corp.aol.com/press-releases/2009/09/america-online-youth-wired-survey-finds-kids-are-online-average-four-days-week>
- Rowlands, I., Nicholas, D., Williams, P., Huntington, P., Fieldhouse, M., Gunter, B., Withey, R., Jamali, H. R., Dobrowolski, T., & Tenopir, C. (2008). The Google generation: the information behaviour of the researcher in the future. *Aslib Proceedings*, 60(4), 290-310. Retrieved from <http://www.emeraldinsight.com/journals.htm?articleid=1733495&show=pdf>
- Rugutt, J., & Chemosit, C. C. (2009). What motivates students to learn? Contribution of student-to-student relations, student-faculty interaction and critical thinking skills. *Educational Research Quarterly*, 32(3), 16-28.
- Savolainen, R. (2006). Media credibility and cognitive authority: The case of seeking orienting information. *Information Research*, 12(3), 12.
- Saunders, M. N., Saunders, M., Lewis, P., & Thornhill, A. (2011). *Research methods for business students* (5th ed.). Dehli: Pearson Education India.
- Saunders, M., Lewis, P., & Thornhill, A., (2007). *Research methods for business students*. Harlow, UK: Prentice Hall.
- Saunders, W. M., Goldenberg, C. N., & Gallimore, R. (2009). Increasing achievement by focusing grade-level teams on improving classroom learning: A prospective, quasi-experimental study of Title I schools. *American Educational Research Journal*, 46(4), 1006-1033.
- Schacter, J., Chung, G., & Dorr, A. (1998). Children's internet searching on complex problems: Performance and process analyses. *Journal of the American Society for Information Science*, 49(9), 840-849.

- School Sanitation. (2005). *Children's learning*. Retrieved from <http://www.schoolsanitation.org/BasicPrinciples/Children'sLearning.html>
- Seefeldt, C. (1998). Assessing young children. In C. Seefeldt & A. Galper (Eds.), *Continuing issues in early childhood education* (pp. 314–338). Upper Saddle River, NJ: Merrill.
- Shenton, A. K. (2004). Research into young people's information-seeking: perspectives and methods. *Aslib Proceedings: New Information Perspectives*, 56(4), 243-254.
- Shenton, A. K., & Dixon, P. (2004). Issues arising from youngsters' information-seeking behavior. *Library & Information Science Research*, 26(2), 177-200.
- Shenton, A. K., Nasset, V., & Hayter, S. (2008). Children's conceptualizations of the word 'Information'. *Journal of Librarianship and Information Science*, 40(3), 151-164.
- Siddiquee, N. A. (2008). E-government and innovations in service delivery: the Malaysian experience. *International Journal of Public Administration*, 31(7), 797-815.
- Siegler, R. S. (1998). *Children's thinking* (3rd ed.). Upper Saddle River, NJ: Prentice Hall.
- Sinnott, J. D. (1989). A model for solution of ill-structured problems: Implications for everyday and abstract problem solving. In J. D. Sinnott (Ed.), *Everyday problem solving: Theory and applications* (pp. 72-99). New York: Praeger.
- Silverman, D. (2009). *Doing qualitative research*. Thousand Oaks, California: Sage.
- Soeters, K.E., & Schaik, K. V. (2006). Children's experiences on the internet. *New Library World*, 107(1220/1221), 31-36.
- Solomon, P. (1993). Children's information retrieval behavior: A case analysis of an OPAC. *Journal of the American Society for Information Science*, 44(5), 245-264.
- Søndergaard, M. (2006). The fit between national cultures, organizing and managing. *Information and Organization Design Series*, 6, 103-121.
- Spink, A., & Heinström, J. (2011). Information Behaviour Development in Early Childhood. In A. Spink & J. Heinström (Eds.), *New Directions in*

- Information Behaviour (Library and Information Science, Volume 1)*, 245-256.
- Spink, A., Danby, S., Mallan, K., & Butler, C. (2010). Exploring young children's web searching and technoliteracy. *Journal of Documentation*, 66(2), 191-206.
- Spruell, E. (2002). Issues & controversies: Simple in a smart kind of way. *Multimedia Schools*, 9(1), 24-26.
- Susskind, A.M., Bonn, M.A., & Dev, C. S. (2003). To look or book: an examination of consumer's apprehensiveness toward Internet use. *Journal of Travel Research*, 41(3), 256-264.
- Swaminathan, V., Lepkowska-White, E., & Rao, B. P. (1999). Browsers or buyers in cyberspace? An investigation of factors influencing electronic exchange. *Journal of Computer-Mediated Communication*, 5(2).
- Tan, S. M., & Singh, D. (2008). An assessment of the information literacy levels of library and media teachers in the Hulu Langat district, Malaysia. In A. Abrizah, et al. (Eds.), *Proceedings of ICOLIS 2008 held in Kuala Lumpur, Malaysia* (p. 7989). Kuala Lumpur: University of Malaya.
- Tashakkori, A., & Teddlie, C. (1998). *Mixed methodology: Combining qualitative and quantitative approaches* (Volume 46). Thousand Oaks, California: Sage.
- Tashakkori, A., & Teddlie, C. (Eds.). (2003). *Handbook of mixed methods in social & behavioral research*. Thousand Oaks, California: Sage.
- Tashakkori, A., & Teddlie, C. (2010). *Sage handbook of mixed methods in social & behavioral research*. Thousand Oaks, California: Sage.
- Tayeb, M. H. (1996). *The management of a multi-cultural workforce*. Chichester, UK: John Wiley & Sons.
- Taylor, R. S. (1967). Question-negotiation and information-seeking in libraries. DTIC Document. *Technology: From Ideas to Bits and Back*, 142-49. Medford, NJ: Information Today.
- Taylor, S. J. (1992). Children's usage of information retrieval system. Doctoral Dissertation, Columbia University.

- Teddlie, C., & Tashakkori, A. (2010). Overview of contemporary issues in mixed methods research. In A. Tashakkori & C. Teddlie (Eds.), *Sage Handbook of Mixed Methods in Social & Behavioral Research* (pp. 1-41). Thousand Oaks, California: Sage.
- Tellis, W. (1997). Application of a case study methodology. *The Qualitative Report*, 3(3), 1-17.
- Tilburt, J. C., Goold, S. D., Siddiqui, N., & Mangrulkar, R. S. (2007). How do doctors use information in real-time? A qualitative study of internal medicine resident precepting. *Journal of Evaluation in Clinical Practice*, 13(5), 772-780.
- Vakkari, P. (1999). Task complexity, problem structure and information actions: Integrating studies on information seeking and retrieval. *Information Processing & Management*, 35, 819-837.
- Vakkari, P., & Järvelin, K. (2005). Explanation in information seeking and retrieval. In A. Spink & C. Cole (Eds.), *New directions in cognitive information retrieval* (pp. 113-138). Springer Netherlands.
- Valcke, M., Bonte, S., De Wever, B., & Rots, I. (2010). Internet parenting styles and the impact on Internet use of primary school children. *Computers & Education*, 55(2), 454-464.
- Van, D. J. (2010). Search engines and the production of academic knowledge. *International Journal of Cultural Studies*, 13(6), 574-592.
- Voss, J. F., & Post, T. A. (1988). On the solving of ill-structured problems. In M. H. Chi, R. Glaser & M. J. Farr (Eds.), *The nature of expertise* (pp. 261-285). Hillsdale, NJ: Lawrence Erlbaum Associates.
- Wallis, J. (2005). Cyberspace, information literacy and the information society. *Library Review*, 54(4), 218-222.
- Walter, V. A. (1994). The information needs of children. *Advances in Librarianship*, 18, 111-129.
- Wang, S. & Reeves, I. (2007). Political use of the Internet, political attitudes and political participation. *Asian Journal of Communication*, 17(4), 381-395.

- Watson, D. M. (2001). Pedagogy before technology: Re-thinking the relationship between ICT and teaching. *Education and Information Technologies*, 6(4), 251-266.
- Weiler, A. (2005). Information-Seeking Behavior in Generation Y Students: Motivation, Critical Thinking, and Learning Theory. *Journal of Academic Librarianship*, 31(1), 46-53.
- White, R. W., & Ruthven, I. (2006). A study of interface support mechanisms for interactive information retrieval. *Journal of the American Society for Information Science and Technology*, 57(7), 933-948.
- Wildemuth, B. (2009). *Applications of social research methods to questions in information and library science*. Westport, CT: Libraries Unlimited.
- Wildemuth, B. (2003). Why conduct user studies? The role of empirical evidence in improving the practice of librarianship. *INFORUM 2003: 9th Conference on Professional Information Resources*, Prague. Retrieved from [http://www.inforum.cz/archiv/inforum2003/prispevky/Wildemuth\\_Barbara.pdf](http://www.inforum.cz/archiv/inforum2003/prispevky/Wildemuth_Barbara.pdf).
- Wildemuth, B. M. (2004). The effects of domain knowledge on search tactic formulation. *Journal of the American Society for Information Science and Technology*, 55(3), 246-258.
- Wilson, T. D. (1997). Information behaviour: An interdisciplinary perspective. *Information Processing and Management*, 33(4), 551-572.
- Wilson, T. D. (1999). Models in information behaviour research. *Journal of Documentation*, 55(3), 249-270.
- Wilson, T. D. (2000). Human information behaviour. *Information Science Research*, 3(2), 51-55.
- Wilson, T. D. (2006). On user studies and information needs. *Journal of Documentation*, 62(6), 658-670.
- Wong, D., & Baker, C. (1998). Pain in children: Comparison of assessment scales. *Pediatric Nursing*, 14(1).
- Xiang, Z., & Gretzel, U. (2010). Role of social media in online travel information search. *Tourism Management*, 31(2), 179-188.

- Xie, I. (2008). *Interactive information retrieval in digital environments*. New York: Igi Publishing.
- Yaacob, R. A. R., & Omar, S. (2003). The training of teacher librarians in comparison with professional librarians in Malaysia. *Malaysian Journal of Library & Information Science*, 8(2), 27-41.
- Ya'acob, A., Nor, M. F. N., & Azman, H. (2005). Implementation of the Malaysian Smart School: An Investigation of Teaching-Learning Practices and Teacher-Student Readiness. *Internet Journal of e-Language Learning & Teaching*, 2(2), 16-25.
- Yin, R. K. (2003). *Case study research: Design and methods* (3rd ed.). Thousand Oaks, California: Sage.
- Yin, R. K. (2011). *Qualitative research from start to finish*. New York: Guilford Press.
- Yin, R. K. (1994). *Case study research: Design and methods* (2nd ed.). Thousand Oaks, California: Sage.
- Yong, J.A. (2008, March 12). Battle lost in cyberspace. *The Straits Times*. Retrieved from [http://www.straitstimes.com/Free/Story/STIStory\\_215784.html](http://www.straitstimes.com/Free/Story/STIStory_215784.html)
- Yousoof, M., Sapiyan, M., & Kamaluddin, K. (2007). Measuring cognitive load—solution to ease learning of programming. *Proceedings of World Acad. Sci. Eng. Technology*, 216-219.
- Zain, M. Z. M., Atan, H., & Idrus, R. M. (2004). The impact of information and communication technology (ICT) on the management practices of Malaysian Smart Schools. *International Journal of Educational Development*, 24(2), 201-211.
- Zawawi, S., & Majid, S. (2001). The information needs and seeking behaviour of the IMR biomedical scientists. *Malaysian Journal of Library & Information Science*, 5(1), 25-41.

## Appendix A: Survey Questionnaires



Ref.No:

--	--	--

This questionnaire is the first part of a study to be conducted on how primary school children in seeking information for academic purposes using the Internet. The questionnaire is divided into three parts.

### Part A (Demographic Data)

**Instruction: Please (✓) the appropriate box**

1. Age

<b>9</b>	<b>10</b>	<b>11</b>	<b>12</b>	<b>13</b>

2. Grade

<b>4</b>	<b>6</b>

3. Gender

<b>Female</b>	<b>Male</b>

4. How long have you attended this school,

<b>Less than 1 year</b>	<b>1 year</b>	<b>More than 1 year</b>

5. School's name,

---

6. Do you have computer at home?

<b>Yes</b>	<b>No</b>

7. If yes, does is have internet access?

<b>Yes</b>	<b>No</b>



### Part B (Internet Environments Use and Knowledge)

8. How do you rate your ability to locate information using the internet?

Expert	Moderate	Beginner
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

9. How often do you use the internet in school? (Choose one)

- a. ☐ Not at all
- b. ☐ Once a week
- c. ☐ Twice a week
- d. ☐ 3-5 times a week
- e. ☐ More than 5 times a week

10. For what purpose do you use these web services?  
(You can choose more than one)

- a. ☐ Assignments/School Project/Homework
- b. ☐ News group services
- c. ☐ Email services
- d. ☐ Entertainment (games, chat, shopping)
- e. ☐ Others, please specify\_\_\_\_\_

11. What type of information do you search for?  
(You can choose more than one)

- a. ☐ Science and Technology
- b. ☐ Mathematics
- d. ☐ Language
- e. ☐ History
- f. ☐ Others, please specify\_\_\_\_\_

12. Types of resources you use to find information using school's network  
(You can choose more than one)

- a. ☐ Library online catalog
- b. ☐ Electronic database
- c. ☐ Web Resources
- d. ☐ CD-ROMS
- e. ☐ Others, please specify\_\_\_\_\_

13. List three type of your favorites search engines to find information

- 1. \_\_\_\_\_
- 2. \_\_\_\_\_
- 3. \_\_\_\_\_

14. Why do you like your favorite search engines?

\_\_\_\_\_  
\_\_\_\_\_

15. Does anybody assist you with finding information from internet?  
(Rank it)
- a. ☐ Teachers
  - b. ☐ Teacher-Librarians
  - c. ☐ Parent/Guardian
  - d. ☐ Friends
  - e. ☐ Myself
  - f. ☐ Others, please specify \_\_\_\_\_
16. What challenges do you have in finding information from internet?
- a. ☐ Network Accessibility
  - b. ☐ Not enough computer
  - c. ☐ Less skill (interface/instruction/menu/spelling)
  - d. ☐ Others, please specify \_\_\_\_\_

**PART C ( Variable of Information Seeking Process)**

No	Questions	Always	Sometimes	Never
17	I use more than one search engine to find information for my task.			
18	I search the information by myself			
19	I get help from a teacher to find the information.			
20	I need the librarian to assist me esearching the information			
21	I have difficulty finding information on a topic			
22	I use Web enviroment to search the information for class assignments.			
23	I read and take notes on ideas			
24	I discuss with others about information that I find.			
25	I recheck and verify the information before making a final decision.			

End of Questions, Thank You

## **Appendix B: Observation Checklists**

### **Information Seeking Processes among School Children in Australia and Malaysia**

#### **Observation**

##### **Observation Procedures**

The observation will occur over a five day period with a maximum of five hours observation. The study involves observation of children seeking information from the Internet and viewing their navigational skills and will take approximately 20 minutes. School children will be given task scenarios with questions to solve using the World Wide Web by teachers.

##### **Observation and coding units**

During the observation, the researcher will write down everything that the school children did and said. This will be done using interval coding. The coding sheets consist of columns for the researcher to record time, information-seeking processes every 2 minutes. In the activity columns the researcher will tick verbal and non verbal activities. The coding sheets will provide the researcher detailed information about the school children information seeking processes in solving the task given.

##### **Observation confidentiality**

All the names of the school children involved in the study will be unidentified in order to protect their privacy and confidentiality.

Reference Number: \_\_\_\_\_

**Observation sheet (Individual Observation)**

Location : \_\_\_\_\_ Time : \_\_\_\_\_  
 Date : \_\_\_\_\_ Child ID : \_\_\_\_\_  
 Gender : ☐ Male ☐ Female Age : \_\_\_\_\_  
 Duration : \_\_\_\_\_ Task No : \_\_\_\_\_

Stages	Actions	Researcher's notes	Feeling/Code	T i m e
Topic Initiation (Search)	Identify/understand information need			
Topic Selection (Scan)	Self web exploration/Keywords Browse/Boolean			
	Choosing resources			
	Search results			
	Choice of results (1pg,2pg)			
	Interaction with interfaces/menu			
Topic Exploration (Chain)	View/Locating relevant information			
	Follow the links			
	Use sponsored links			
	Using reference collection provided by school information retrieval systems			
Topic Formulation (Select)	Reading/filtering information			
	Select Techniques			
	Taking notes on ideas			

Information Collection (Capture)	Recording/copy collected information			
	Saving information			
	Rechecking/verification information			
	Taking notes			
Topic closure (Presentation)	Presentation of information (Sentences/Table/Image)			
Tool	Search engines used			

Additional Information:

1. Questions asked:

---

2. Problems/Challenges:

---

#### CODES

MOVES	TACTICS	FEELING
T=TYPE	R=REVIEW MATERIAL	😊 C=CONFIDENT
S=SCROLL	M=MODIFY QUERY	😊 N=NEUTRAL
B=BACK BUTTON	R=SWITCH RESOURCE	😡 F=FRUSTRATION
D=DELETED	C=COPY INFORMATION	
A=ARROW		
F=FOLLOW LINKS		

## **Appendix C: Teacher Interview Questions (Semi-Structured)**

## Appendix C: Teacher Interview Questions (Semi-Structured)

---

1. How long have you attended the school?  
\_\_\_\_\_
2. Any teaching experienced, before, where?  
\_\_\_\_\_
3. Other working experienced?  
\_\_\_\_\_
4. How long have you been teaching?  
\_\_\_\_\_
5. Any subject specialization?  
\_\_\_\_\_
6. Qualifications in \_\_\_\_\_
7. How important information literacy in teaching and learning process?  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_
8. How do you describe your teaching style in using Internet?  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_
9. What types of activities do you ask your student to do...research/homework for academic purposes, personal research, browsing, chat, email, and any other activities? Can you give example/describe the task/activities?  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

## Appendix C: Teacher Interview Questions (Semi-Structured)

---

1. Any particular subject? Time allocated for your session or per week using Internet. Do you provide guidance to them? And do you suggest any particular link/site (e.g Yahoo, Google, or any specific website) to be used?

---

---

---

---

---

2. Can you describe, what are the processes undertaken by your student to seek information from internet? In what ways do you influence the information seeking behavior of your students?

---

---

---

---

---

---

---

3. What challenges do you find with children seeking information from web environments?

---

---

---

---

---

4. From my observation with children in this school, some of them have a difficulties in reading, spelling and understanding the information from internet, how to overcome this problems in your class?

---

---

---

---

14. What is the information seeking strategies, techniques, skill that use in the class?

---

---

---

---

15. Why do you like about using the Web environment for locating



## Appendix C: Teacher Interview Questions (Semi-Structured)

---

information? Do you have any preferences of resources for students to find information for their academic purposes? Web Environments or other resources (library online, online databases)

---

---

---

---

---

16. Do you think that current search engine such as Google/Yahoo suitable for primary school children to seek information for their academic purposes? Any specific design interface for them?

---

---

---

---

---

17. Have you undertake any type of training for professional development? Is there any training would you recommend to undertake?

---

---

---

---

---

End of Questions  
Thanks for Your Time

## Appendix D: Plain Language Statement

Dear Participant

### Plain Language Statement

My name is Shamila M.Shuhidan and I am a PhD student in the School of Business Technology at RMIT University. My research topic is Information Seeking among Primary School Children in Australia and Malaysia. The aim of this project is to investigate information seeking among primary school children in grade 4 and 6, (aged approximately 10 and 12) for academic purposes. This study will lead to an in depth understanding on how children seek information within a school context, particularly the processes taken for information searching in solving tasks given by teachers and make recommendations to information children. Participants will be answered a survey questionnaires and asked to perform one information seeking task in the 20-minute session. During the session participants will discuss the activities they are performing while completing the task. Parts of my research involve interviewing teachers. The interviews will take approximately 20 to 40 minutes. I, personally, will conduct the sessions. Results from the sessions will be reported as group results only and the participant or the school will not be identified by name.

I would like to invite you to participate in this PhD research project. Your support is much appreciated, and participation is voluntary: you may withdraw at any time, and request that any unprocessed data concerning your information be withdrawn. My ethics project number is 55/08 and my working with children check (WWC) number is 01516180.

The data collected, including interviews record and transcripts will be stored according to RMIT University guidelines for the five years required. All interviews and analyses will be treated with utmost confidentiality. Any publications or writing will not be reported in a form that identifies the participants. Only I and my supervisors will have access to the data. Notification of the outcomes of the research will be offered to participants. The research will be published in professional academic journals and conferences.

If you have any queries concerning your participation, please do not hesitate to contact me or my supervisor (details below) and we are happy to answer them for you. If you agree, I would appreciate you completing the attached consent form. Ethics approval for the research was initially sought at, and granted by RMIT University.

#### RESEARCHER

Shamila Mohamed Shuhidan  
School of Business IT  
RMIT University  
Melbourne, Vic 3001  
  
Tel: (03) 9925 5452  
[S3187259@student.rmit.edu.au](mailto:S3187259@student.rmit.edu.au)

#### SUPERVISOR

Dr Peter Macauley  
School of Business IT  
RMIT University  
Melbourne, Vic 3001  
  
Tel: (03) 9925 5583  
[peter.macauley@rmit.edu.my](mailto:peter.macauley@rmit.edu.my)

Yours Sincerely,

Shamila Mohamed Shuhidan

Should you have any concerns about the conduct of this research, please contact the Research Development Unit, RMIT Business, GPO Box 2476V, Melbourne 3000 Victoria. Tel (03) 9925 5888 or Fax (03) 9925 1313 or RMIT ETHICS committees, Tel. (03) 9925 2251, (03) 9925 7958 .

## Appendix E: Consent Form

### Consent Form for Persons Participating in Research Projects Involving Interviews, Questionnaires or Disclosure of Personal Information

School	<b>Business of Information Technology</b>
Name of participant	
Project Title	<b>Information Seeking Processes among Primary School Children in Australia and Malaysia</b>
Name of Researchers	<b>Shamila Mohamed Shuhidan</b>

I acknowledge

1. That aims, methods, and anticipated benefits and possible risks of the research study have been explained to me.
2. That I voluntary and freely consent to my participation in this project.
3. I understand that results will be used for research purposes and may be reported in professional and academic journals, and that, unless I consent otherwise, my identity will be protected.
4. Individual results **will not** be released to any person except at my request and on my authorization.
5. That I am free to withdraw my consent at any time during the study, in which event my participation in research study will immediately cease and any information obtained from me will not be used from then onwards.

#### Participant's Consent

Participant	
	(Signature/ Date)

#### Where participant is under 18 years of age:

I consent to the participation of \_\_\_\_\_ in above research.

On behalf of participant:	
	(Signature of parents or guardian/Date)